THE NEWSPAPER OF INFORMATION SYSTEMS MANAGEMENT
April 20, 1992 · Vol. XXVI · No. 16 · 130 Pages · $2/Copy · $48/Year

COMPUTERWORLD

IBM to buy piece of superserver maker

Deal will provide entree to parallel processing

BY MICHAEL FITZGERALD
CW STAFF

WHITE PLAINS, N.Y. — IBM will soon buy a piece of Parallan Computer, Inc. and will offer products from the Mountain View, Calif.-based maker of high-level servers to Big Blue's customers later this quarter, according to sources close to IBM.

IBM will purchase as much as 20% of Parallan, a 3-year-old, $10 million company, the sources said, and will sign a joint development agreement that reportedly will pave the way for production of servers that fit between Parallan's System 290 OS/2 application superservers and two high-end IBM Personal System/2 Model 95s, which are due out next week.

As part of its agreement with Parallan, IBM is expected to resell System 290s while the new products are being developed.

Observers said the pending deal foreshadows a future in which IBM will offer an asymmetric parallel processing server designed to run mission-critical applications, including CICS programs. Those servers may appear within two years.

IBM officials declined to comment on the deal. However, Davis S. Fields III, marketing director at Parallan, acknowledged that his company has had talks with IBM as part of its search for a large computer company to act as a partner.

Continued on page 12

CA revamps pricing, support

BY THOMAS HOFFMAN
CW STAFF

ISLANDIA, N.Y. — Computer Associates International, Inc. last week made sweeping changes to its pricing and customer support policies, acceding to users' demands that the software giant become more responsive to their changing technological and financial requirements.

The price changes range from giving credits of up to 50% to mainframe system users who are moving systems software to fewer CPUs to cost-savings incentives for users who are downsizing their computing environments (see chart at right).

Customers come first

Customer service and support changes include assigning two representatives to each account — one for client service and one for technical support. Previously, CA had assigned one account manager to each client.

The moves give CA a head start among mainframe software vendors that must recalibrate their licensing and service policies to meet users' needs (see story page 16).

Although CA executives provided few specific cost comparisons between the new and old plans, customers said the programs are a step in the right direction.

"It sounds very good on the surface," said Tom Shafer, vice president of corporate computing and communications at Martin Marietta Data Systems in Orlando, Fla.

"Anything that improves continuity in accounts management is a step forward," added James Bradshaw, director of database administration for administrative programming services at Clemson University in Clemson, S.C.

CA executives said the new programs reflect the changing needs of its customers, many of

Continued on page 16

Starting over

Computer Associates' revamped pricing consists of the following:

Investment savings: Gives clients a credit for licenses that become redundant when multiple CPUs are replaced by fewer but larger CPUs.

Upgrade savings: Nontiered pricing option allows clients to run licensed programs on any CPU tier as long as the license is active.

Maintenance savings: Onetime subscription fee of 30% of current program list price enables users to reduce their yearly maintenance fee by up to 40%.

Enterprise license: Grants clients the right to use a specific product anywhere within the enterprise as long as all computers and sites are identified. The license fee is based on the total number of enterprise MIPS.

Downsizing savings: Gives users a credit, similar to the investment savings plan, when they migrate from centralized to distributed systems.

To qualify, users must be registered for CA's Total Client Care program, a comprehensive set of on-line services that monitor software use.

Schwab invests big in OSF

BY ELISABETH HORWITT
CW STAFF

Having determined that its current mainframe-centric systems cannot stand the pace of its rapidly expanding brokerage business, San Francisco-based Charles Schwab & Co. will become one of the first shops to move to a distributed client/server architecture based on the still-emerging Open Software Foundation protocols.

High costs associated with using the old systems — and the payroll for the 60 full-time people assigned to the downsizing project — are pushing the $800 million discount stockbroker to

Continued on page 14

Sherry Anderson
Schwab's senior VP of technology

Seeking new vistas

Factors driving Schwab's client/server embrace

- **Host systems can't keep up with the firm's growth.**
- **Mainframe operation and development costs are rising.**
- **Provides an opportunity to re-engineer the business.**
- **Offers a chance to enter new businesses.**

Court dismisses core of Apple GUI suit

Microsoft, HP licensing defense upheld; industry awaits written ruling

BY JAMES DALY
CW STAFF

SAN FRANCISCO — A ruling by a federal judge last week may have crippled Apple Computer, Inc.'s high-stakes copyright infringement suit against Microsoft Corp. and Hewlett-Packard Co.

After listening to three hours of legal swordplay, U.S. District Judge Vaughn Walker surprised many observers by declaring that many of the Macintosh screen graphics Apple claims the pair allegedly copied were either not protected by copyright law or come under a 1985 technology licensing pact.

Walker's ruling was the latest development in a case that has revolved to some extent around the question of whether Apple's screen is subject to copyright protection. "The decision shows that Apple has not been able to define its case," said Jon Marshall, an attorney at HP's outside counsel Pennie & Edmonds in New York. "The display is not a piece of art. It's a tool."

Experts noted that an Apple victory would have had a dramatic effect on the industry because the Cupertino, Calif., firm would have gained control over critical computer technology. An Apple defeat not only would mean business as usual but also may lower some software prices because it could encourage developers to craft applications with capabilities similar to the Macintosh.

"The lawsuit is now much more of an annoyance and clearly not life-threatening to Microsoft anymore," said Ronald Abramson, an attorney specializing in intellectual property rights at the New York law firm of Hughes, Hubbard & Reed.

"Judge Walker has taken the guts out of the lawsuit," he added. Following the oral ruling, Microsoft's stock jumped 10%, gaining $11.87.

Walker did not rule on whether 23 items under dispute in the newer Windows 3.0 — ranging

Continued on page 20

INSIDE

It's not a boom, but first-quarter results are showing signs of life in the computer industry. Page 4.

Chicago flood dampens few IS spirits. Page 6.

IBM eyes OS/2 network management plan. Page 12.

Product Spotlight — A new class of 15 to 19 page per minute laser printers are changing network computing. Page 81.

NEWSPAPER

IN THIS ISSUE

NEWS

4 IBM, Apple, Lotus and **Microsoft** report strong first-quarter sales.

4 Lotus readies its update of 1-2-3 for Windows.

6 IS shops in Chicago coped well with last week's flood.

7 AMR and **CSX** join forces with a new freight-tracking system.

7 Mead Data Central plans move to a client/server architecture.

8 DEC introduces three upgradable 486 PCs.

8 Go's PenPoint operating system hits the market.

10 PeopleSoft makes a battle plan to encroach on **D&B** territory.

10 Bulletin board users report no major problems with Windows 3.1.

12 IBM announces SystemView-compliant product.

12 DEC will have to convert some users for its Polycenter strategy to be a success.

15 Banyan users sound off on lack of direct vendor support.

20 SunSelect prepares enhanced network file-sharing system and Unix-to-LAN net integration product.

24 SAS Institute readies alpha version of EIS builder.

Quotable

"I have serious concerns about the ethical, legal and sources-and-methods questions surrounding the issue of industrial espionage."

ROBERT GATES
CIA

On the CIA's technology-monitoring initiative. See story page 121.

DESKTOP COMPUTING

31 IBM digs in to market OS/2 2.0.

36 Technology Analysis: **Borland's** Quattro Pro 4.0 for DOS has improved graphics.

WORKGROUP COMPUTING

39 Ungermann-Bass plans to add Asynchronous Transfer Mode support.

ENTERPRISE NETWORKING

67 Nynex and **Ameritech** still seek a niche in network management.

LARGE SYSTEMS

71 'Information warehouse' holds different meaning for different firms.

APPLICATION DEVELOPMENT

77 Software AG ships Unix versions.

MANAGER'S JOURNAL

103 Craig Goldman goes for the gold at **Chase Manhattan Bank.**

PRODUCT SPOTLIGHT

81 What is best for your LAN: several less powerful printers or one workhorse?

BUYERS' SCORECARD

95 HP's LaserJet IIIsi is the high scorer among LAN-capable laser printers.

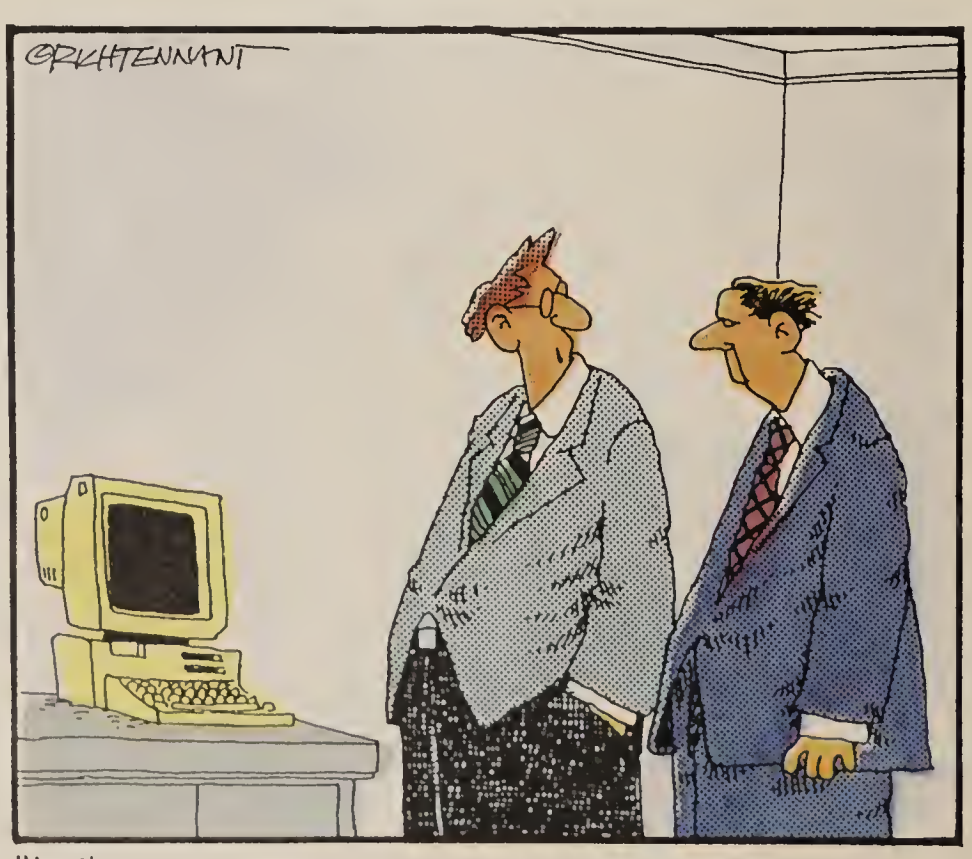
IN DEPTH

99 Olivetti Research Lab focuses on multimedia, intelligent badges. By Andy Hopper.

DEPARTMENTS

6, 16 News Shorts
25 Advanced Technology
28 Editorial
105 Intelligence Files
106 Computer Careers
107 Managing Your Career
117 Marketplace
120 Stocks
121 Computer Industry
122 Inside Lines

The 5th Wave



"WE'VE EXPANDED THE MEMORY ON THIS ONE SO MANY TIMES IT'S STARTING TO GET STRETCH MARKS."

EXECUTIVE BRIEFING

■ **Computer Associates, which has taken plenty of jabs for its customer relations,** plans a major overhaul of its pricing and support policies. Some of the changes include pricing incentives for users who are downsizing and the addition of more customer representatives. **Page 1.**

■ **The intelligent shared office of the future** will be driven by multimedia, intelligent badges and networking if the efforts under way at Olivetti Research Lab are any indication. Using Asynchronous Transfer Mode networks, researchers can videoconference in real time or send one another video mail. Furthermore, research on an intelligent badge/infrared sensor system may make it possible to tailor a user's work space to his specific requirements, such as left-handed use of a mouse button. **Page 99.**

■ **Charles Schwab may well be the first major corporation to stake its systems strategy** on the Open Software Foundation's protocols. Because it wants to begin rolling out this architecture next year, Schwab has joined OSF and is prodding some vendors to get its needs met. **Page 1.**

■ **Bug reports on Microsoft's Windows 3.1 have surfaced** on the various user networks, but the majority of user feedback says the software is stable. **Page 10.**

■ **IBM pushes ahead with its end-user marketing** campaign, which includes hundreds of user events and an 800 number for orders. **Page 31.**

■ **Printer makers are taking steps toward creating "network printers."** These 15 to 19 page/min. devices can be directly attached to the LAN, connect to more than one network or host and manage diverse jobs with automatic language switching and paper-handling features. **Page 81.**

■ **IBM and other key companies came through with healthy earnings** in the first quarter. Some industry observers said those results could reflect an uptick in the U.S. economy. **Page 4.**

■ **A flood warning gave Chicago IS directors time** last week to implement disaster plans before billions of gallons of water from the Chicago River could ruin their operations. About two dozen shops shifted to off-site back-up centers, while others systematically shut down their equipment. **Page 6.**

■ **IBM is expected to take a stake in Parallan,** a maker of OS/2-based application superservers. The company plans to add to its server line by reselling Parallan boxes and jointly developing new servers. **Page 1.**

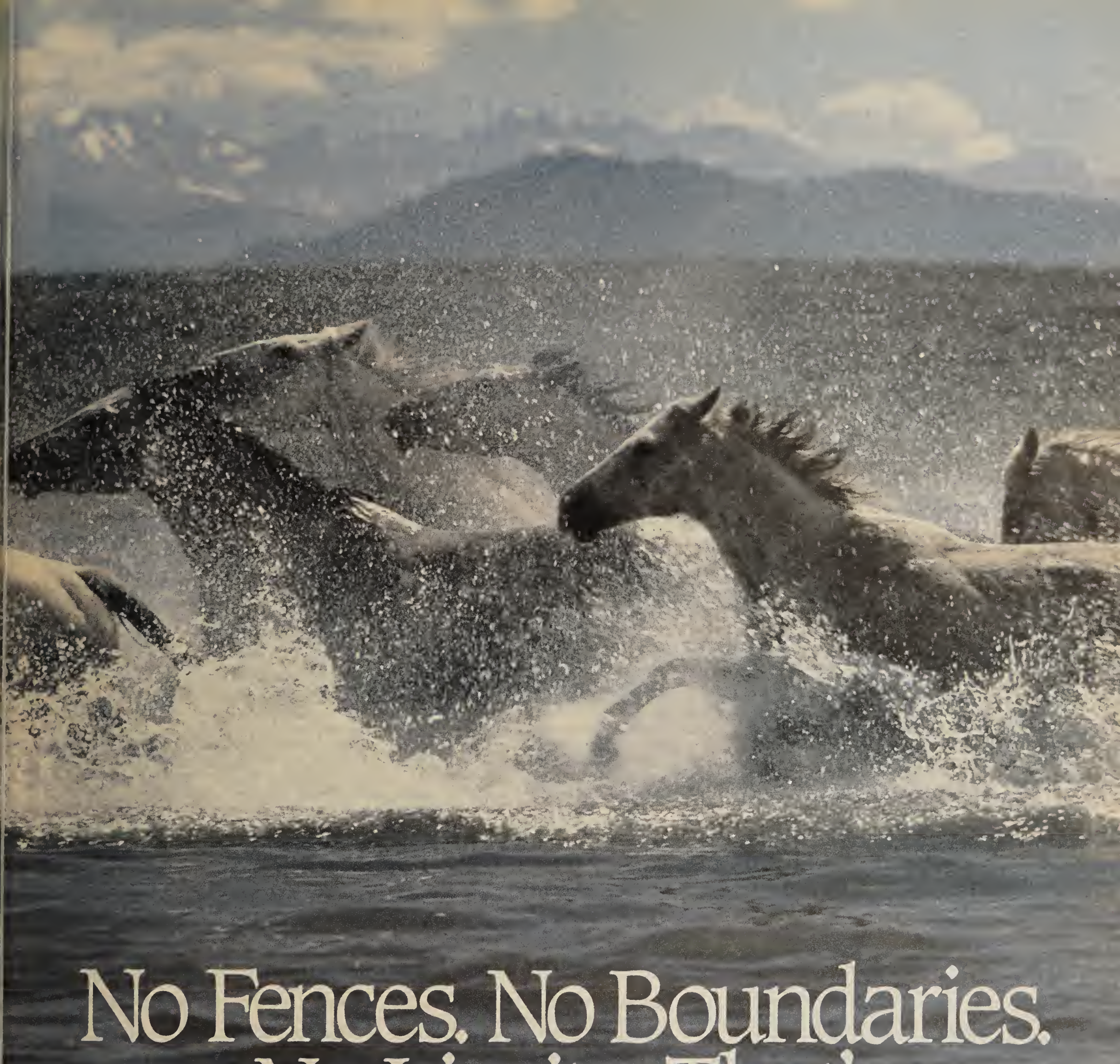
■ **If you are interested in an information warehouse,** you first need to define your world. Early implementations of the warehouse concept are as varied as the users themselves. **Page 71.**

■ **DEC rolled out three high-end PCs** last week based on the snap-in parts architecture from Intel. **Page 8.**

■ **The next generation of LANs** could feature cell-switching technology and transmission speeds of up to 2.8G bit/sec. Hub vendor Ungermann-Bass has outlined its plans for Asynchronous Transfer Mode technology at the LAN level. **Page 39.**

■ **Lotus could see an upswing** in its Windows spreadsheet market share now that the second release of 1-2-3 for Windows is shipping. **Page 4.**

■ **On site this week:** The bare-bones budgeting of a not-for-profit life means the members of the production team for the Alvin Ailey Dance Co. generally have to pay for their portable computers. But those computers help the show open on time. **Page 34.** Rockwell International reports success in tying disparate systems together with Ameritech's 'manager of managers.' **Page 67.**



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Trendsetters show uptick in Q1 earnings

Results prompt some to herald signs of overall recovery; others warn against too much optimism

BY NELL MARGOLIS
CW STAFF

BOSTON — IBM and other bellwether computer companies posted respectable to stellar first-quarter revenue gains last week (see chart), prompting some vendors and analysts to see signs of a long-awaited upturn in the U.S. economy. However, analysts warned against interpreting the uptick as the first stage of a surge.

Users also weighed in on the cautious side. Frozen information systems budgets may be thawing, several said, but the result is more likely to be a trickle than a flood of near-term spending on computer goods and services.

An IBM spokesman cited "a general pickup in the U.S. economy" as helping boost the firm's near double-digit rise in U.S. sales for the quarter ended March 31; several Wall Street analysts echoed the observation. But Brown Brothers, Harriman & Co. analyst William Milton noted that "IBM beat last year's first quarter — but that wasn't the hardest thing in the world to do."

IBM's earnings, which came in at the high end of analysts' expectations, preceded upbeat results reported by Apple Computer, Inc., Lotus Development Corp. and Microsoft Corp.

The earnings followed heavy losses reported earlier by Digital Equipment Corp. [CW, April 13] and its colleagues in the traditional midrange market [CW, April 6]. The red ink recorded by minicomputer makers, however, is related more to market specifics than economic conditions, analysts said.

And they're off

First-quarter financials get the new year off to a decent start

Q1 1992

Company	Revenue	% increase from same quarter 1991	Net income	% increase from same quarter 1991
IBM	$14B	3.3%	$595M	—
Apple	$1.72B	7.4%	$135.1M	3%
Lotus	$227.1M	30%	$20.8M	215%
Microsoft	$681M	40%	$179M	44%
TI	$1.7B	3%	$40M	174%

CW Chart: Janell Genovese

Conference Board economist Ken Goldstein, while confirming signs of a coming recovery, emphasized that "signs" and "coming" may be the operative words. Much of the first quarter's upbeat look and feel, he said, is relative. "Instead of being flat dead in the water, we're moving at a snail's pace," Goldstein noted.

That reality does not appear to have been lost on users.

"We're not about to take off on a buying spree," said Don Ruthig, IS director at *The Baltimore Sun*. The newspaper publisher, a subsidiary of The Times Mirror Co., is proceeding into perceived economic recovery "with cautious optimism," Ruthig said. "We're going forward on purchases we know are important, but we have no grand plans. Largely, we're managing better with what we've got rather than buying more."

Diamond Star Motors Corp., a Mitsubishi Motors Corp.-owned automobile manufacturer based in Normal, Ill., did go on a buying spree in recent months, installing 100 IBM 80386-based personal computers linked across a 50-user Token Ring network and outfitting them with new spreadsheet, word processing, database and graphics software. However, according to IS manager Rex Schemerhorn, the spate of technology investment had nothing to do with broad-based economic recovery.

"Even with the economy being flat and auto sales low, we didn't cut back on [our IS] budget," Schemerhorn said. "In fact, we did just the opposite." Reasoning that recovery, when it came, would escalate customer demands on the auto firm, "We took advantage of the slow time to do retraining and retooling in areas across the company," he said.

Like Diamond Star, Chicago-based Tribune Broadcasting Co. used technology to cushion itself against economic downturn. The company, whose seven independent television stations rank it among the nation's five largest broadcasters, invested several years ago in sophisticated broadcast schedule modeling and advertising investment forecasting software and Data General Corp. MV200 platforms on which to run it.

The DG-based systems, IS director Bill Murray said, allowed the company to sharpen its planning and shave its costs sufficiently so that Tribune's IS department "didn't hold back our buying to any remarkable degree" during the worst of the recession. Now that "the economy seems to be trending up," he said, no escalation in IS spending is on the immediate agenda.

Meanwhile, Cleveland-based primary metals manufacturer Brush Wellman, Inc.'s IS director James Dudziak noted that even "trending up" is a stretch for some users and, consequently, for boosts in IS spending.

Staff writer Kim S. Nash also contributed to this report.

Trickle, not torrent

Users are buying more computers, but the numbers show they are making their purchases cautiously

Total value of computers purchased in the U.S.

	'92*	'93*
Micro	$75.44B	$83.70B
Medium	$31.57B	$34.50B
Large	$31.30B	$33.63B

*Projected

Source: Computer Intelligence/InfoCorp
CW Chart: Janell Genovese

Sit tight for upturn

The Conference Board, a New York economic think tank, measured no significant change in business investment in computers and peripherals during the first quarter.

However, the pace could pick up in the year's remaining quarters and in 1993, according to Conference Board economist Ken Goldstein.

The Conference Board is currently projecting 7% to 8% gains in corporate investment in the computer industry over the next two years, he said, based on one overriding assumption: Commercial user firms, having weathered wrenching corporate downsizings and restructurings, are gearing up to enhance their competitive stances by arming their slimmed-down work forces with the best technology extant.

"We can't prove that this will happen — it's just a projection," Goldstein noted. "But otherwise, all the quality-control talk has been mere lip service, and what we've gone through hasn't been a re-engineering or reorganization — it's just been a job squeeze."

NELL MARGOLIS

Lotus polishes Windows in updated spreadsheet

BY ROSEMARY HAMILTON
CW STAFF

CAMBRIDGE, Mass. — With the release this month of Version 1.1, an improved 1-2-3 for Windows, Lotus Development Corp. could begin to boost its market share after an embarassing entry to the Windows arena late last year, observers said last week.

However, users and analysts also said they expect Lotus will feel some lingering effects from its initial debut with the buggy 1-2-3 for Windows Release 1.0. That, combined with cutthroat competition from Microsoft Corp.'s Excel and the expected Borland International, Inc. Quattro Pro for Windows, will make it difficult for Lotus to easily gain market share.

Currently, Lotus holds about 41% of the Windows spreadsheet market while Excel accounts for 59%, according to PC Research in Washington, D.C. The company tracks distributor activity, and its latest numbers are based on shipments between October 1991 and January 1992.

Revenue share

Meanwhile, Lotus claims it holds 25% of the market on a revenue basis. It bases its numbers on data from the Software Publishers Association.

"I think [Release 1.1] is the product that Lotus would have wanted as its first release," said Jude Gartland, a senior vice president at Lehman Brothers, a divison of Shearson Lehman Brothers, Inc. in New York. "I think 1.1 addresses the problems well, but it's been a long time, and I think that hurts [Lotus]," he added.

Release 1.1 adds a number of ease-of-use improvements. Screens have been enhanced, and the company has improved performance for such functions as scrolling and drag and drop. "Depending on what screen [element] it is, we've improved it by two to five times," said Paul McNulty, director of spreadsheet marketing at Lotus.

Lehman, a longtime 1-2-3 shop, is currently undergoing an "extensive evaluation period" to review the Windows spreadsheet offerings. "What happened is the early adopters of Windows had to go with Excel. So, there's a group of people here who like it a lot," Gartland said.

Yet, Canadian National Railway Co. expects a signficiant migration from its 1-2-3 for DOS installed base once there is a wide-scale movement to the Windows platform.

"There is a history of companies making mistakes like this before," said Ronan McGrath, the company's vice president of information systems and accounting, referring to the 1-2-3 for Windows debut. "For a period of time people are more circumspect. But the issue is if there's a series of mistakes, not if a company makes one."

> "FOR A PERIOD of time people are more circumspect. But the issue is if there's a series of mistakes, not if a company makes one."
>
> RONAN MCGRATH
> CANADIAN NATIONAL RAILWAY

While the current Lotus market share numbers are hardly what a spreadsheet leader would want, they were also achieved in a six-month period.

Jeff Tarter, publisher of the "Softletter" newsletter, said he believes 1-2-3 for Windows is selling well relative to Excel. "I'm not saying Excel is going to go away, but it turned out to be relatively easy for Lotus to grab a big piece of market share against a product that was very entrenched."

Added McNulty, "In the beginning of 1991, we were basically nowhere in the Windows market. Now we're No. 2. There's no question we've got a lot of work to do. But to come from zero to 25% — we feel pretty good about that."

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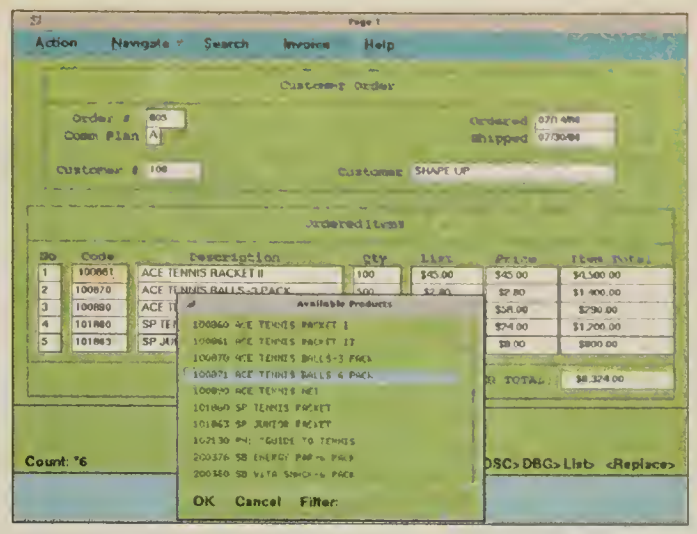
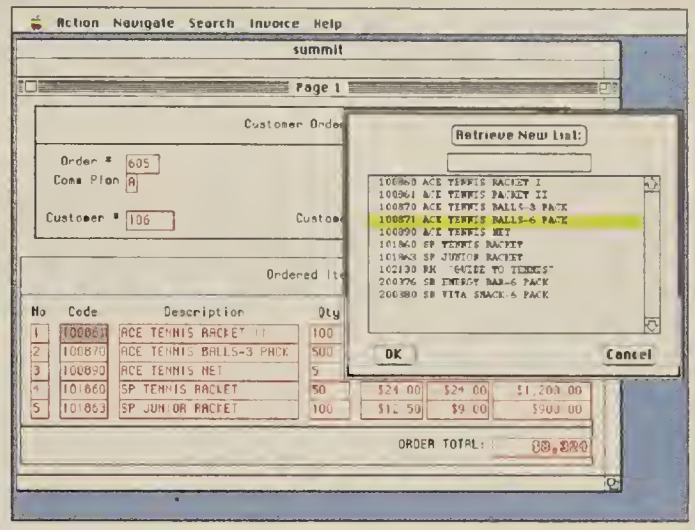
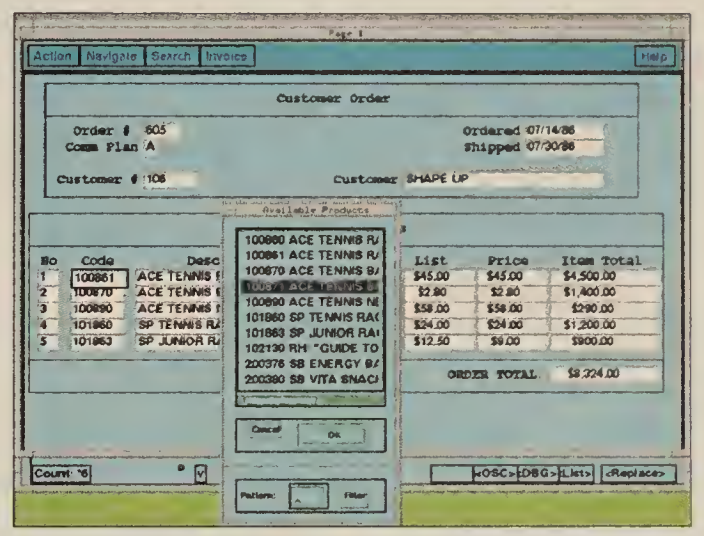


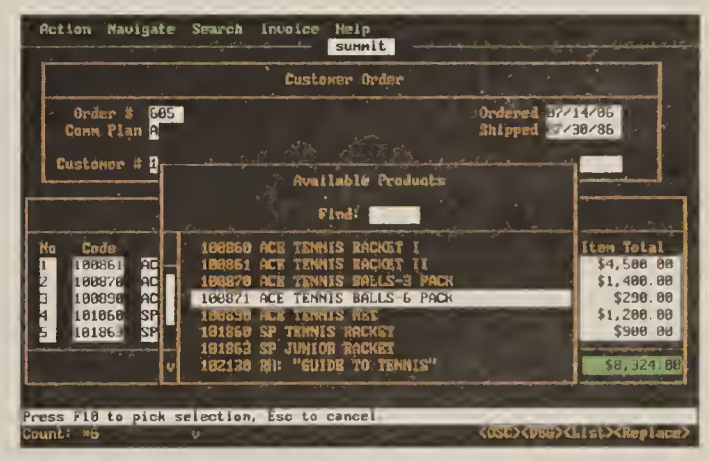
Open Look



Macintosh



Motif



Character Mode

Block Mode

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NEWS SHORTS

Police crack major hacker ring

Police in San Diego said late last week that they have cracked a nationwide informal ring of about 1,000 computer hackers that have charged hundreds of thousands of dollars worth of fraudulent credit card purchases and phone calls. The investigation, in conjunction with the FBI and the San Diego District Attorney's office, has led to two arrests in Ohio; authorities said scores more are likely. The investigation led to the seizure of computers and related materials in New York, Seattle and the Philadelphia area. Part of the investigation focuses on information hackers allegedly obtained illegally from computers at Equifax Credit Information Services, Inc. in Atlanta, according to published reports.

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Olivetti chairman guilty of fraud

An Italian court last week found Carlo De Benedetti, chairman of Italian computer maker Ing. C. Olivetti C. S.p.A., and 32 others guilty of fraud in connection with the collapse in 1982 of Banco Ambrosiano, once Italy's largest private bank. De Benedetti, 57, was sentenced to six years and four months in jail. Under Italian law, convicted felons do not have to start serving the sentence unless the conviction is upheld by a Court of Appeals and the Supreme Court. De Benedetti plans to appeal, a process that could take several years.

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DR DOS 6.0 does Windows 3.1

Despite being banned from Microsoft Corp.'s Windows 3.1 beta-test program, Digital Research, Inc. last week announced a Windows 3.1-compatible "business update" of DR DOS 6.0. The updates offer fine-tuning of existing features. DRI spokesmen said the firm got around the ban by working with DR DOS users who were Windows 3.1. beta-test users. Anxious users can download the update off the DR Forum on CompuServe.

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IRS center wins U.S. quality award

The Internal Revenue Service's data processing center in Ogden, Utah, won the 1992 Presidential Award for Quality, the government equivalent of the Malcolm Baldrige National Quality Award in the private sector. Last week the Federal Quality Institute cited the Ogden center, which processes tax returns for a 14-state region, for excellent customer service and a 96.2% accuracy rate for data entry of Form 1040 information.

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Borland eyes tools purchase

Rumors were swirling last week that Borland International, Inc. was pitching a merger to Lotus Development Corp., but the only deal Borland was talking about publicly was an agreement to acquire two development tools: Brief and Sorcerer's Apprentice from Hingham, Mass.-based The Software Developer's Co. The accord hinges on Software Developer's first gaining ownership from the companies that now grant it marketing rights to the products. Borland declined to say whether it will pick up employees from Software Developer's.

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Short takes

U.S. Sprint Communications Co. will build and operate Russia's first intercity packet-switched data network. . . . **Digital Equipment Corp.** said it will create multimedia products for release in the third quarter. . . . **Computer Sciences Corp.** inked a two-year pact with the **British Royal Air Force** to create a modernized logistics system, valued at $23 million. . . . **The General Services Administration** (GSA) has signed a contract under which **Sprint** will supply electronic data interchange (EDI) services, including interconnections to other EDI providers, the GSA and other federal government agencies. . . . **DEC** sold $1 million worth of VAXstations and VAX 4000 machines to the **Unigraphics** division of **Electronic Data Systems Corp.** . . . The **Paris Stock Exchange**'s revamped trading system will be centered around **Tandem Computers, Inc.**'s fault-tolerant NonStop Cyclone mainframes and software licensed from the **New York Stock Exchange**.

More news shorts on page 16

Great Chicago Flood of '92: IS groups stay high and dry

Thanks to warning, businesses shut down systems to prepare for outage

BY ELLIS BOOKER
and JIM NASH
CW STAFF

CHICAGO — As a quarter of a billion gallons of Chicago River water raced beneath the commercial district here last Monday morning, downtown information systems executives had just about an hour to decide their best response to the disaster.

The choice was the same for many: an orderly powering down of mainframes and networks in anticipation of a blackout and a telephone call to their disaster-recovery providers.

Almost two dozen IS shops went so far as to move their processing to off-site backup centers, according to local disaster recovery companies. Monday, in fact, was the busiest day in the history of Rosemont, Ill.-based Comdisco Disaster Recovery Services, Inc., with a total of 16 disaster "declarations" by 1 p.m.

Apparently, an hour was sufficient notice for IS shops. Many IS executives said they were thankful for the advance warning from the city and Commonwealth Edison, the electric utility here.

"We were given enough notice they were going to evacuate buildings and shut down [commercial power] that we all had time to take the systems down systematically," said Chuck Nails, data center manager at Interstate National Corp., a subsidiary of Fireman's Fund Corp.

The Great Chicago Flood of 1992, sure to go down in the history books alongside the Great Chicago Fire of 1871, occurred when a construction crew driving pilings into the Chicago River accidentally caused a breach in a 58-mile-long network of coal-delivery tunnels built at the turn of the century. Within hours, the subbasements of downtown skyscrapers resembled scenes from the movie, *The Poseidon Adventure*, as murky water reached depths of up to 37 feet.

Larger issues sparked

For all but a few data centers, however, the problem was not water but the resulting power and telecommunications outages as well as the building evacuations that sent tens of thousands of workers home last Monday morning and kept many away from the area for most of the week.

"We were notified by the city, and thinking that it might shut down power in a larger area, we brought our systems down," said Tom Schertler, project leader at USG Corp. USG runs IBM Application System/400 and System/36 midrange computers as well as Novell, Inc. NetWare networks.

Tom Ladd, vice president of systems technology at CNA Insurance Cos., also got word of the impending power outage and had his systems down by 8 a.m. Monday. But he was back in CNA's red office tower by midnight to restore the systems to normal operation.

However, the Chicago Board of Trade (CBOT), a few blocks away, was not so lucky. Billions of dollars of business were reportedly lost because of the power outage.

The exchange, one of the world's largest commodity futures exchanges, was one of the hardest hit in the flood after the basement electrical vault in its main building was covered with 20 feet of water.

The CBOT was closed all that day and opened only for abbreviated hours during the rest of the week.

Terminals and electrical power were set up at the CBOT's annex while nearby exchanges chivalrously lent office space to firms that normally work in the CBOT's main building.

Glen Belden, the CBOT's vice president of IS, said the warning call he received at 6:30 a.m. on the day of the flood allowed him to start bringing down the 14 Tandem Computers, Inc. hosts in the CBOT's main building. The hosts were off-line by 10:45 a.m., as were the IBM 3090 mainframes that clear executed trades.

"Who could have expected the river would take the city down?" asked Belden, noting that the loss of commercial electrical power over such a wide area was unprecedented, and thus it would have been difficult to protect against such a disaster.

AP/Wide World

Worker for State of Illinois *pumping water last week as downtown Chicago battled flooding*

Undecided few

Even Stone Container Corp., which originally selected its current headquarters in 1987 in part because the building was connected to multiple power grids, was uncertain about the dependability of power last week.

As late as last Wednesday, Joseph Thompson, director of MIS and chief information officer at Stone Container, was in meetings deciding whether to move data processing into a Sungard Recovery Services, Inc. hot site.

Nor did height offer any advantage to IS shops. On the 50th floor of the mighty Sears Tower, Farley Industries, Inc. moved quickly to minimize confusion and data loss.

"We immediately started reducing the number of users online to the bare essentials in case electricity was suddenly cut," said Joanne Suczynski, manager of IS at Farley, maker of Fruit of the Loom underwear.

The tower, which is the world's tallest building, was closed altogether last Monday afternoon, at which time, Suczynski said, all systems were shut off. The company backed up its data a day later and claimed that the power outage was a "minor inconvenience."

Meanwhile, reports of widespread power outages inconvenienced some IS shops when power shutdowns in their area did not materialize.

"That was bad news," said Jim Prokos, computer room supervisor at Hartmarx Corp. Hartmarx pulled the plug on its IBM 4381 and 4341 computers, interrupting regularly scheduled data backups. The company never lost power, however, and had to perform double duty downloading information on Tuesday.

AMR, CSX to market freight-tracking system

BY CLINTON WILDER
CW STAFF

NEW YORK — AMR Corp. and CSX Corp., both noted for ambitious business strategies in the transportation industry, will jointly launch a bold initiative in the information technology sector this week.

At a press conference here Thursday, the two firms are expected to roll out Encompass, a system billed as a single point of contact through which freight shippers can track shipments from their desktops.

The project has been under development for three years by Global Logistics Venture (GLV), a Cary, N.C., partnership owned equally by AMR, the parent company of American Airlines, and railroad giant CSX. Encompass will be marketed to the transportation industry worldwide.

Although GLV refused to give details, the system reportedly consists of a personal computer and software that will allow customers to access a Digital Equipment Corp. VAXcluster at GLV.

Encompass software will allow users, such as freight forwarders and brokers or logistics and warehouse managers, to call up data from the many different organizations involved in a freight shipment. Such data may include shipment location, status or billing rates. Initial planning for the system dates back nearly seven years, according to Jack Cooper, former chief information officer at CSX.

Coming from the top

Both companies' chairmen, AMR's Robert Crandall and CSX's John Snow, will introduce the product. "They're rolling out the big guns," said Cooper, who is now CIO at Joseph E. Seagram & Sons, Inc.

James Marston at American President Cos. in Oakland, Calif., a leading transportation industry CIO familiar with Encompass, said he was skeptical about the market's need for such a system. "We have not really seen the benefit for us as a carrier," he said. "It brings a third party between us and our customers, which may not be a good relationship."

The venture marks the first foray into the information services business for CSX, which is highly regarded in its use of information systems in internal operations. AMR owns the Sabre travel reservation system and newer offerings such as Confirm, a hotel-rental, car-air reservation system now in beta testing.

"You can't draw a parallel between Sabre and Encompass," said Marston, who was vice president of MIS at American Airlines from 1982 to 1987. "Sabre was primarily American [Airlines] extending its own distribution system, since 80% of its tickets were sold by travel agents. This is a whole new business."

Mead goes to client/server

BY ELLIS BOOKER
CW STAFF

DAYTON, Ohio — With a little cooperation from neighbor NCR Corp., Mead Data Central, Inc. last week said it plans to move its core business applications over to a client/server platform.

The multimillion-dollar contract with NCR covers both hardware and software and follows a three-month test performed early last year at NCR's offices here. NCR beat IBM, Unisys Corp. and Digital Equipment Corp. for the contract, Mead Data sources said. Financial details of the deal were not released, however.

The re-engineering of Mead Data's old Cobol-based business systems — such as inventory, invoicing and order management — had already begun, according to Gary Whitney, Mead Data's director of system evaluation. Some applications, he added, are now running on the NCR Unix platforms in parallel with ones on the company's IBM MVS-class mainframes.

Mainframes will remain at Mead Data, athough they will increasingly take on the role of large file servers, Whitney said.

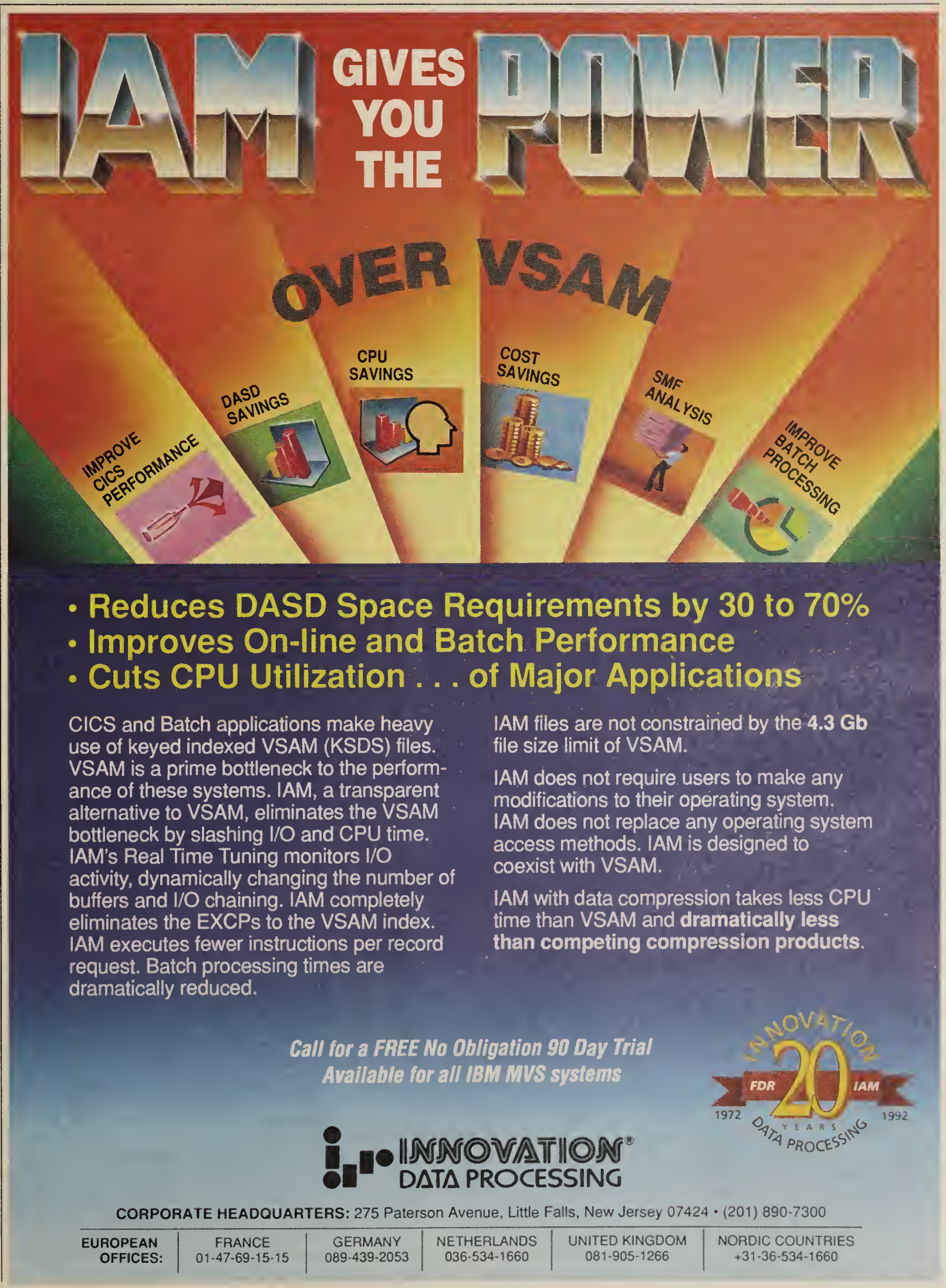
Mead Data began investigating client/server architectures three years ago, "when the requirements of the business changed, and we had to develop applications much more quickly," Whitney explained.

Although Whitney is hopeful the client/server approach will result in cost savings, he has not quantified those benefits yet. A subsidiary of The Mead Corp., Mead Data is the provider of the massive Lexis and Nexis on-line research systems. Both databases currently use mainframes, and there is no plan to move them to a Unix environment.

Mead Data said it planned to take receipt of an unspecified number of NCR System 3000 Model 3550s, symmetric multiprocessors that use 50-MHz Intel Corp. I486 processors. The company will also buy NCR's Model 3450 deskside and Model 3445 departmental servers.

The System 3000, built around Intel's microprocessor family, is a seven-level, scalable product line ranging from laptops to a yet-to-be-released massively parallel System 3700.

In addition, Mead Data will use Cooperation, NCR's Unix-based cooperative processing office-automation software.



Go's PenPoint system arrives

New handwriting-recognition engine can decipher sloppy penmanship

BY JAMES DALY
CW STAFF

SAN FRANCISCO — Let the games begin.

Go Corp. last week finally released its PenPoint pen-based operating system, which includes a number of features that have been enhanced since it was first unveiled to the developer community in January 1991.

The system has been re-engineered into a 32-bit multitasking architecture in order to take advantage of the 386-based machines that are expected to drive growth in the fledgling pen market.

Go Chairman Jerry Kaplan said his company plans a series of major and minor revisions to PenPoint. "There will be minor upgrades along the way, but the next major revision will occur sometime in 1993 when we release an international version," he said.

Go has also developed a new version of its GoWrite handwriting-recognition engine that is easier to learn and more tolerant of sloppiness and shape variation. The engine now recognizes more than 700,000 handwriting and gesture samples.

Delivery of PenPoint means that nearly all of the pieces are in place to see if the much ballyhooed pen market will finally take off with the gusto that some analysts have predicted.

PenPoint and Microsoft Corp.'s Windows for Pen Computing extension, which was released a week earlier, are not the first pen-based operating systems, but they are expected to speed the transition of pen computing to more general-use applications from its present vertical blue-collar focus.

While delays in getting out pen-based hardware and software systems have forced many analysts to revise their market-growth projections back several quarters, users who have grown impatient with the hype surrounding pen computing said they are glad that promises are finally becoming products.

"Our frustration is that we've been shown the capability of pen-based systems and have sold management on it, but now we want to go the next step and get our hands on the hardware and the operating systems," said William D. McHugh, principal methods analyst at the Newark, N.J., office of Public Service Electric and Gas Co.

Although industry observers have painted the Go and Microsoft pen competition as a David vs. Goliath showdown, it seems likely that both will find a place in the potentially explosive market. Already, the two are working on establishing interoperable ink-capture standards. "It's no longer an us vs. them situation," Kaplan said.

Hardware vendors seem to see it that way as well: NCR Corp.'s pen machine, for instance, can run either Windows for Pen Computing or PenPoint.

Kaplan said both systems will evolve to target different customers. Windows for Pen Computing is more likely to appeal to people who want a pen adjunct to their desktop machines, while PenPoint will be attractive to mobile professionals such as insurance adjusters, he said.

Analysts said only one hurdle remains for pen computing: a lack of pen-based personal computers. "It's nice to have the operating systems available, but until the hardware ships in volume, it's going to be pretty meaningless," said Bill Lempesis, publisher of Pleasanton, Calif.-based newsletter "Penvision News."

As a result of lagging hardware shipments, Lempesis has scaled back his original 1992 pen PC sales projections from 488,000 units to 288,000 units.

Analysts said both PenPoint and Windows for Pen Computing require at least a 386-based pen machine to run efficiently, and those machines are just beginning to arrive.

Going for it

The debut of Go's PenPoint was buttressed by the announcement that 25 hardware and 22 software firms will support it. Among them were the following:

• IBM, with its first pen computer: the ThinkPad. Early deliveries are expected in July.

IBM also unveiled the Pen Developer Assistance Program, which was designed to help users create pen-based applications.

• Other hardware vendors, including NCR, Grid Systems Corp., NEC Technologies, Inc. and Toshiba America Information Systems, Inc.

• PenMagic Software, Inc., a North Vancouver, British Columbia-based firm, with Numero, software that enables mobile pen users to complete a wide variety of financial tasks.

Following the script

The basic elements of IBM's pen system are:

Processor	20 MHz 80386
Memory	4M bytes, expandable to 8M bytes
Mass storage	20M-byte, solid-state memory
Options	External 1.44M- or 2.88M-byte floppy drive
Power	Nickel cadmium battery with three-hour life
Dimensions	12 1/4- by 9 3/16- by 1 3/18 in.
Weight	6.01 pounds
Price	Not available
Limited availability	Volume shipment in fourth quarter

CW Chart: Michael Siggins

• Sitka Corp., with its PenTops networking software, which will be bundled with each copy of PenPoint.

• Oracle Corp., which will port SQLNet to PenPoint, allowing tablet systems to become clients of Oracle and IBM mainframe databases.

JAMES DALY

DEC unveils line of upgradable 486 PCS

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. scored a first for its personal computer business last week with the introduction of three high-end Intel Corp. I486-based systems sporting the modular "snap-in parts" approach of Intel's Xpress architecture.

When the DECpc 400ST line hits the market at the end of this month, the machines will be the first with built-in upgradability from current 486 technology to Intel's forthcoming P5 (80586) microprocessor.

DEC plans to pitch the 400ST line as an alternative to Compaq Computer Corp.'s DeskPro line and Dell Computer Corp.'s Powerline DE systems. Analysts said street prices among the three appear comparable, and they noted that the new DEC boxes can pack in more memory and disk storage.

"In a sense, DEC is late to the modular, upgradable world. But they are offering something no one offers now: the Intel Xpress technology and an upgrade path to the P5 chip," said Richard Zwetchkenbaum, a senior analyst at International Data Corp. (IDC) in Framingham, Mass.

Have it your way!

All of DEC's upgradable systems come with 8K bytes of internal cache, 4M bytes of RAM (expandable to 192M bytes) and six EISA bus expansion slots

Model	Processor	List price	Direct mail
DECpc 425ST	25-MHz 486SX	$4,397	$3,000
DECpc 433ST	33-MHz 486DX	$4,836	$3,300
DECpc 450ST	50-MHz 486DX	$6,595	$4,500

Source: Digital Equipment Corp. CW Chart: Janell Genovese

The Xpress technology allows snap-in upgrades of processors, memory and disk drives. "For people buying PCs now, upgradability is an investment protection," Zwetchkenbaum said.

Whether the time-to-market advantage of a few months will prove a sales boon to DEC is a tough call to make, Zwetchkenbaum said. "Part of the PC market is getting exposure and mind share," he said. "It's key to come out with something that makes people take note."

It adds up

IDC predicted that 10.3 million PCs and single-user workstations would ship in the U.S. in 1992, some 580,000 of them at the 486DX level. "That's only about 5%," Zwetchkenbaum said. "But in dollar value, it's a little better. The total value of PC shipments in the U.S. will be $24.7 billion in '92; about $2.75 billion will be 486DX machines."

DEC's PC line now spans a performance range from 4.6 million instructions per second (MIPS) to the 40-MIPS Model 450ST.

Company officials said the high-end PC and deskside server line is targeted at three areas: high-performance users in engineering or science, departmental local-area network servers and/or small, multiuser systems.

"The 400ST family is especially targeted at customers who intend to integrate new and existing PCs into office networks," said George Wright, acting group manager for DEC's PC Business Group.

Priced from $4,397 to $6,595 — and available for roughly 30% less through DEC's Desktop Direct mail-order catalog — the Models 425ST, 433ST and 450ST are industry-standard PCs built by Intel with the same chassis, power supply and motherboard. Their clock speeds are, respectively, 25, 33 and 50 MHz. Final assembly and software loading is done by DEC at its Albuquerque, N.M., site.

The 450ST line supports a choice of operating systems: MS-DOS, Microsoft Corp.'s Windows 3.0 and 3.1, IBM OS/2 and The Santa Cruz Operation's SCO Unix 3.2.4, SCO Open Desktop 1.1 and later versions. Users also have a choice of networks.

CORRECTIONS

In an April 13 page one chart titled "Free fall," the percent decline in notebook list prices from late 1990 was incorrectly listed. It should have read 54%.

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An item in the Jan. 13 issue, "NCR users join the CASE race," incorrectly stated that LBMS, Inc. was the first firm to port computer-aided software engineering (CASE) tools to the NCR Corp. System 3000. In fact, Long Beach, Calif.-based Synthesis Computer Technologies, Inc. also makes a CASE product, called CASE/AP, that runs on System 3000.

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In "Theos Software Updates Multiuser DOS" [March 23], the price of the Theo+ DOS Version 2.0 operating system should have been listed as $599. Also, the headquarters of the Multiuser DOS Federation has moved from Santa Clara, Calif., to Minneapolis.

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In a chart on page 35 of the April 6 issue, Microsoft Corp.'s Windows 3.1 has an upgrade price of $79.95. A special $49.99 upgrade price is being offered by Microsoft until June 1.

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PeopleSoft rollout beats D&B to client/server market punch

BY KIM S. NASH
CW STAFF

WALNUT CREEK, Calif. — The generation gap between software makers came to the fore last week when start-up PeopleSoft, Inc. brought out client/server-based financial packages and vowed to "go after" the older, mainframe-oriented installed base of Dun & Bradstreet Software.

The move comes three weeks after D&B Software renewed a year-old promise to introduce its own client/server finance applications [CW, March 30].

Observers signaled thumbs-up for PeopleSoft, noting that unlike D&B Software, the 5-year-old company can now provide full-fledged applications running in client/server mode.

D&B Software plans a June release of personal computer-based reporting tools designed to complement existing big-iron applications. However, complete client/server financial packages will not be generally available until early 1993, a spokeswoman said.

Meanwhile, PeopleSoft announced the following new products:

- PeopleSoft Financials, a set of general ledger, asset management and accounts receivable and payable modules priced from $100,000 to $200,000 each. PS/General Ledger for SQLBase and IBM's DB2 are due in June, with versions for other databases to follow later this year, when the other three financial modules come out.
- PS/nVision, an end-user graphical reporting and query tool, will be bundled with PS/General Ledger.

Financial software is a new field for PeopleSoft, whose human resources packages are used at 95 sites in the U.S. However, "We're going after D&B's customers," said Dave Duffield, president and founder of PeopleSoft. Integral Systems, Inc., Tesseract Corp. and Ross Systems, Inc. are other rivals, he added.

Analysts interviewed last week said PeopleSoft does give users more to bite into than D&B Software does.

"It doesn't have the stature, but PeopleSoft has the technologic edge," said Natasha Krol, program director for application development strategies at Meta Group, Inc.'s San Francisco office.

D&B Software's stature adds up to a worldwide installed base of 12,400 sites, according to Bobby Cameron, director of strategy and business development at the Framingham, Mass.-based company.

Some users — such as Goldman, Sachs & Co. and the New York State Department of Civil Service — said they are going for deliverables over promises.

Despite "sound" plans, D&B Software has shown little in terms of product, said Jeff Goddard, branch coordinator of financial management systems at Ontario Hydro.

"We wanted to get going right away," Goddard said. The Toronto-based utility just bought PS/General Ledger.

Few bugs found in Windows 3.1

BY CHRISTOPHER LINDQUIST
CW STAFF

REDMOND, Wash. — It has been a week since the release of Windows 3.1, and bug reports are indeed filtering in to Microsoft Corp. But the majority of user reports on several electronic messaging systems — including Usenet, CompuServe and Relaynet — seem to indicate the updated graphical user interface is fairly stable.

Several bulletin board users indicated that they had installed 3.1 on a variety of systems with few or no problems. Those problems that did appear seem to be minor inconveniences more than potentially damaging errors.

Among the errata reports and solutions posted on the electronic boards were the following:

- Memory Parity Errors were reported by some users who were told by other users to try solving the problem by disabling the write cache of SMARTDrive Version 4, which is supplied with Windows 3.1; or by switching to SMARTDrive Version 3 (shipped with Windows 3.0); or by deleting old Windows 3.0 swap files. However, David Cole, group program manager for Windows 3.1, said parity errors indicate a hardware problem that can only be solved by having memory and other hardware checked and possibly replaced.
- Control-Alt-Delete to reboot crashed DOS sessions works best when DOS applications are run in full-screen mode.
- Problems with video support occurred with some video boards, including those from ATI Technologies, Inc. and Orchid Technology, Inc., running at higher resolutions. Microsoft recommended getting updated drivers from the vendors or from a Microsoft library on the CompuServe MSWIN forum.
- A number of Windows 3.1 packages were shipped with bad disks that prevented the product from being installed.

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IBM to put SystemView on OS/2 platform

BY ELISABETH HORWITT
CW STAFF

AUSTIN, Texas — One of the first solid product offerings to embody IBM's SystemView architecture, temporarily dubbed Distributed Systems Management (DSM), will appear later this year as an OS/2 2.0-based platform, IBM announced last week.

In the long term, DSM will represent the SystemView "nirvana," described by one IBM spokesman as multivendor, enterprisewide network and systems management using common database, graphical user interface (GUI) and communications elements. DSM will bring that architecture to managing multivendor local-area network systems and physical devices, according to Al Rosen, a program manager of systems management at IBM.

While IBM has announced a SystemView GUI and data structure and has revealed promises of support from a bevy of third-party partners, it has yet to provide a full-function commercial implementation of the platform.

DSM will also address a long-standing user demand that IBM provide one consistent offering for managing its own and other vendors' LANs. "IBM saw the trap of having three incompatible platforms: NetView/6000, LAN Network Manager and NetView," said David Passmore, a principal at Ernst & Young.

The initial product will support applications such as centralized software distribution to remote workstations, fault and performance monitoring of databases, applications and the operating system itself, according to Rosen.

No pricing or shipment dates were available.

Rosen said IBM plans at some point to discontinue the LAN Management Utilities product, which provides OS/2 management functions.

The following are additional features slated for the initial DSM platform:

- Support of both the Simple Network Management Protocol (SNMP) and the Open Systems Interconnect Common Management Information Protocol of collecting alerts and other information from disparate LAN devices.
- A consistent GUI, including topological mapping so that network managers do not have to learn new commands for each type of LAN they manage.
- A consistent database for integrating applications.
- A common application programming interface (API) for third-party management software, based on the Common Management API for the Open Software Foundation's (OSF) Distributed Management Environment, Rosen said.

Serious support

IBM's support of the OSF's API is "absolutely critical" to ensure that users can run their favorite third-party management applications on IBM's platform, said John Payne, a network analyst at DHL Worldwide Express.

Such support could also help the OSF API become an industry standard that allows users to mix and match applications and network management platforms freely, Payne said.

DHL is looking at IBM's NetView/6000, an AIX-RISC System/6000-based platform for managing Transmission Control Protocol/Internet Protocol LANs via SNMP, Payne said.

He added that he is very interested in enabling various LAN management functions to access the same database and GUI.

DSM will manage everything from LAN servers and workstations to network adapters, routers and media, Rosen said.

The next step will be to port to DSM IBM's LAN Network Manager, an application for managing physical LAN devices on Token Ring networks, he added. DSM will eventually run on the AIX-RS/6000 platform, Rosen said.

IBM may well be counting on DSM to "prevent Novell's NetWare Management System from walking away with the [integrated LAN management] market," Passmore said.

The concept behind DSM and SystemView is "much broader than" the NetWare Management System (NMS), which is focused on managing "the Novell servers themselves" and the LAN media, Rosen said. IBM and Novell, Inc. will work to add NetWare management to DSM, he added.

DEC Polycenter strategy faces leery customers

BY ELISABETH HORWITT
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. last week solidified its DECmcc Director network management platform but apparently has some missionary work ahead of it before it can convert a body of users to its overall Polycenter strategy. Polycenter is a comprehensive umbrella of systems and network management tools that uses DECmcc Director as its cornerstone.

> "I HAVE MIXED feelings" about totally centralized management of enterprisewide networked systems.
>
> ROBERT GRANDLE
> NASA LANGLEY RESEARCH

Major DEC announcements unveiled last week included Version 1.2 of DECmcc Director, which features Ultrix support, better graphics and expanded Simple Network Management Protocol (SNMP) support; an Ultrix-based systems management product for Unix-based systems; and new security systems.

"At first, I thought Polycenter was a marketing ploy, and I still don't know much about it," said Michael Rehberg, a network specialist at The Dow Chemical Co.

Currently a DECmcc Director user, Rehberg said he liked the system's growing ability to integrate a range of network management tools under the same graphical user interface and reporting structure. "So if you're expert in one, you're expert in another," he explained.

However, "the jury is still out" on the Polycenter concept of integrating systems, security, database, network, accounting and performance management under one umbrella, Rehberg said.

Michael Brule, a consultant at John Hancock Financial Services, participated in a field test of DECmcc Director Version 1.2. He said the new version offered far more integration of applications, as well as better graphics. Given that Hancock has tentative plans to start implementing Unix systems, Brule said he was interested in DECmcc Director Version 1.2's optional Ultrix implementation.

Although Hancock is looking at DECmcc Director as one possible platform for consolidating a plethora of network management tools, Brule expressed doubts about the Polycenter concept of having one vendor's platform be responsible for managing everything in the enterprise.

"I have mixed feelings" about totally centralized management of enterprisewide networked systems, said Robert Grandle, a systems manager at NASA Langley Research Center in Hampton, Va. He expressed concern that "centralized management of software distribution, particularly for Unix machines, leaves a large security hole."

Grandle shared Brule's concern that no one vendor can provide optimal management tools for an enterprise's entire range of network devices and systems. — particularly in the software area.

"The database vendors themselves provide the best tools for doing that," he said.

The enhanced DECmcc Director announced last week includes the following:

- The ability to track Transmission Control Protocol/Internet Protocol, DECnet Phase IV and DECnet/Open Systems Interconnect network configurations automatically and display them on a map.
- Support of Remote Network Monitoring, a protocol that allows SNMP stations to collect alerts from local-area network monitoring devices.
- A new DECmcc Director Presentation Module that allows the network manager to scroll through network events in a separate window.
- The ability to track circuit failures and display them on a map.

IBM will buy piece of superserver maker

CONTINUED FROM PAGE 1

The agreement with Parallan would immediately give IBM a presence in the high end of the server market. IBM adds its name to a market where supply, though limited, outstrips demand.

"IBM is buying a niche-filling product as a step to get to its end-game strategy," said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "It considers today's multiprocessors an interim step, and it doesn't want to [build them]."

Dzubeck and others said IBM's proposed agreement with Parallan will immediately validate the superserver market, which lacks definition but features companies such as NetFrame Systems, Inc. and Tricord Systems, Inc.

Absence of features

Superservers generally can support more than one main processor and typically approach minicomputer performance at much lower prices, though they lack the data integrity features and throughput that minicomputers offer. Compaq Computer Corp.'s SystemPro represents the low end of the category.

IBM officials have consistently said they believe personal computer-oriented multiprocessing configurations offer little to no true performance gains over uniprocessor systems, largely because of inadequate software. Analysts said OS/2 2.0 provides IBM with a reason to enter the superserver market.

Several users contacted said they were pleased to hear about the coming deal.

"For database applications or client/server applications, [multiprocessors] would be of interest to us," said Larry Pisko, a systems engineer at The Travelers Corp. in Hartford, Conn.

He said Travelers has looked at Parallan before and liked certain aspects of the product, though the firm did not buy it.

For the future, though, Pisko projected plenty of interest for the type of products that might come out of this deal.

"Applications are growing, and operating environments are becoming much more complex, so it's just a logical progression" to higher level servers, he said.

One Parallan user contacted expressed "relief" at the prospect.

"Our only major concern with Parallan was their financial strength. For our environment — OS/2, SQL Server and LAN Manager — it's far and away the best superserver," said W. B. Sofer, manager of information systems at Chevron Canada in Vancouver, British Columbia, which has two Parallan 290 Series II machines.

Going abroad

The high-end Model 95s are already shipping in Europe and are expected to help IBM compete more effectively with products such as SystemPro by giving it a server with features that increase data availability.

Officials at Tricord refused to comment.

Enzo Torresi, chairman of NetFrame Systems, expressed enthusiasm about the report. "We think it's great for Parallan, for IBM and for the superserver industry," Torresi said.

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Charles Schwab invests big in OSF

CONTINUED FROM PAGE 1

begin rolling the architecture out by year's end, even though few OSF products will be available.

The architecture is expected to take four years to complete, according to Sherry Anderson, Schwab's senior vice president in charge of technology.

"We felt we had to get as open and nonproprietary a solution as possible" to control escalating operations costs, "and we think the OSF approach is the most viable for [achieving] that," Anderson said.

While Schwab is mum on costs, the company hopes to save "tens of millions of dollars" over a seven-year study period, Schwab officials said.

Huge expenses

A project of this magnitude can run seven figures or more, according to Ted Klein, president of Boston Systems Group, Inc., a consulting firm that specializes in downsizing. Figuring that Schwab will use approximately 60 people during a four-year rollout, the project would consume $25 million in personnel costs alone, he added.

The client/server project, moreover, is critical to the brokerage's effort to meet an anticipated increase in stock transactions during the next few years, noted Christi Olson, a senior technical planner at Schwab. The firm, in fact, reported $219.9 million in net revenue for this year's first quarter — a record 74% rise from first-quarter 1991 figures.

Schwab's new architecture, already 18 months on the drawing board, will use OSF/1, the Unix-based operating system for client/server platforms, and the OSF Distributed Computing Environment (DCE) to tie together applications across those systems (see story at right), Olson said.

Schwab may well be the first business of any kind to formally commit its architecture to OSF — and this is not a bad move, according to Rikki Kirzner, a senior analyst at Dataquest, Inc. "OSF/1 is a sound Unix base" that will not lock in user applications because it conforms to other Unix application programming interfaces, she added. Furthermore, OSF's DCE is rapidly expanding beyond the Unix environment to tie in other workstations on users' premises, Kirzner said.

Stella Johnson

Olson (left) and Anderson *wanted 'as open and nonproprietary a solution as possible'*

To minimize the many risks involved in building an architecture on embryonic standards, Schwab has employed tactics such as joining the OSF. It is working closely with early OSF and DCE implementors and hopes to get some OSF products ahead of commercial availability. Given that few OSF products are expected by year's end, Schwab plans initially to use Posix-compliant Unix products that promise OSF support, Anderson said.

Ties that bind

Another Schwab tactic involves exchanging data with companies outside the brokerage industry that are engaged in similar projects to "tie together mainframe and distributed Unix networks," Anderson said. The company is already talking to DHL Worldwide Express, a company in the midst of a similar enterprisewide systems strategy.

The distributed architecture will support Schwab's efforts to expand its business beyond the West Coast to fertile Eastern and Midwest markets, a Schwab spokesman said.

The company has added 48 new branch offices in the past two years and now has a total of 163. It plans to add 15 to 20 more this year, the spokesman added.

Perhaps most importantly, Schwab's client/server platform will be a key component of a major Schwab business re-engineering effort, Anderson said. An 18-person business team is developing data models for analyzing and breaking down procedures and work processes within various Schwab businesses so that they can be "recombined into more logical, efficient patterns," Anderson said.

Many of those patterns involve moving applications and data closer to the users. For example, the mutual funds business is now handled centrally at Schwab, but as the business grows, various branches may do their own trading.

This makes mutual funds a strong candidate for a distributed computing environment that puts the applications and data closer to the branch users.

Anticipation

When OSF technology will be ready for Schwab:

OSF/1	DCE	DME
Available to vendors 18 months ago; DEC, IBM products available now.	Available as of September 1991; products likely to arrive by year's end.	Integrated technology shipping date undetermined; first applications likely in about 2½ years.

Sources: Open Software Foundation; Dataquest, Inc.

CW Chart: Marie Haines

More than downsizing

When Schwab decided on a complete redesign of its systems architecture, it had a lot more in mind than just downsizing from mainframes to Unix-based systems, according to Senior Vice President Sherry Anderson.

Among the elements in Schwab's four-year downsizing plan are the following:

- A client/server platform based on OSF/1. HP, IBM and DEC systems are being considered. Schwab expects to choose initial products and begin trials by year's end.
- A transaction processing architecture based on the DCE, which ties together applications across disparate systems, using remote procedure call technology. Rollout depends on product availability.
- A Fiber Distributed Data Interface backbone to link three buildings at its headquarters in San Francisco. Implementation is expected by year's end.
- Routers to interconnect local-area networks based on Transmission Control Protocol/Internet Protocol and Novell, Inc. IPX protocols.

Schwab is now evaluating such vendors as Cisco Systems, Inc., Wellfleet Communications, Inc., Timeplex, Inc. and Proteon, Inc. It expects to choose a product in about four weeks and to roll out the backbone in 1993.

- A platform to manage distributed computing systems and networks enterprisewide, based on OSF's Distributed Management Environment. Schwab plans to start implementing HP's OpenView and Tivoli Systems, Inc. products next year, which promise a migration path to true Distributed Management Environment compatibility in the future.

Schwab also expects to migrate from its current multidrop lines, which support up to 128K bit/sec. transmission rates, to a network that provides up to T1 speeds on demand on a pay-as-you-go-basis, Schwab Senior Technical Planner Christi Olson said. The idea is to deliver "MIPS on demand" to users in remote branch offices, she added.

ELISABETH HORWITT

Schwab seeks to rent MIPS

At the end of four years, Schwab expects to have 60% of its applications on a client/server platform designed to cope easily with the fluctuating transaction demands of a volatile stock market. In the interim, Schwab hopes to provide more flexibility on its current mainframe base through an ingenious "rent-a-MIPS" strategy that it is trying to sell to its mainframe vendors.

"We installed a Hitachi 420 last December. Then the stock market got real, real busy at the end of this year, and we needed more capacity than the machine had," said Sherry Anderson, senior vice president at Schwab. Hitachi Data Systems Corp. "let us have two additional engines on the box before they made five- and six-processor configurations generally available to the public," Anderson said.

This involved risks on both sides, but Hitachi clearly liked the idea of being able to cite a current user of its 620 system, and "we needed the capacity to respond to market conditions," Anderson said.

Schwab is now negotiating with Hitachi for an even bigger concession: a concept that Schwab Chief Information Officer Mark Barmann dubbed "rent a MIPS." The brokerage firm would continue leasing a five-processor Hitachi mainframe at a conventional rate but would actually have a sixth processor installed. Schwab would pay the equivalent of weekly "insurance premiums" to keep the system available but would essentially pay for it on a per-usage basis, Anderson said.

Hitachi has yet to agree to the deal, but Schwab hopes that pressure to keep a valued customer will prevail, Anderson said. "We've been trying for years to get IBM to do this," she added.

Schwab is also working to ensure that the downsizing effort causes minimal pain to users by starting first with applications that can be migrated easily to the Unix systems, Anderson said. One likely candidate is Information Builders, Inc.'s Focus database, which primarily supports financial analysis and marketing applications at Schwab.

"Unfortunately, the brokerage system is all one application, so we're building a scaffolding to allow us to bridge together the new and old on a temporary basis," Anderson said. For example, programmers are writing applications in IBM's DB2 to be ported to the client/server environment when it is up and running, a Schwab official said. In addition, OSF-based products such as Transarc's Encina will enable applications to transparently access data residing either on a Unix or an IBM CICS DB2 environment.

Schwab's downsizing effort will not have any effect on the company's planned migration of its data center from San Francisco to Phoenix next year [CW, March 16], Anderson said. The data center will continue to have only mainframes.

ELISABETH HORWITT

Network managers criticize Banyan's support

BY JIM NASH
CW STAFF

CHICAGO — Testy network managers attending a Banyan Systems, Inc. user conference here last week openly rejected Banyan's decision to maintain support primarily through authorized resellers. Moreover, users, disgruntled over what they said is inadequate support, hissed and grumbled every time the issue was brought up with company executives.

David Dores, president of the Association of Banyan Users of Canada, opened the conference by saying, "I know it's a little early for this type of thing, but. . . ." Dores then blasted what he said is Banyan's poor support system.

There is a "support wasteland" in the market, he said, that chokes off help from Banyan to information systems managers and from IS managers to end users.

"We have to be increasingly self-reliant" at a time when networks are only growing more complicated, Dores said.

Banyan maintained throughout the five-day meeting that the most cost-effective way for the company to deal with support is through a phalanx of highly trained network resellers. "We have given resellers the tools needed to support Vines customers," said Bill Johnson, product marketing vice president at Banyan.

At a question-and-answer session with company executives toward the end of the conference, the executives said the company has no intention of instituting direct-access support.

But Byron Comp, president of the Association of Banyan Users International (ABUI), reminded Banyan officials that the company would do well to listen to its customers, a policy that several ABUI members — and company executives — acknowledged has only recently begun to be practiced.

"To be honest," said Comp, who is also a network manager at Andover, Mass.-based retailer Marshalls, "my [reseller] doesn't know much more about my network than I do." When a significant problem develops, resellers typically go to Banyan for answers.

"It's really frustrating," added Tony Hinton, telecommunications manager at Agribank in St. Paul, Minn. Moving a call through a reseller to Banyan can waste critical time.

Hinton said he remembers one recent incident where a critical problem that surfaced on a Friday was not resolved until Monday.

Hinton joins a growing chorus of systems managers who are calling for direct access to Banyan when large snafus occur. The cost of such support seems of lesser importance to many.

Support complaints chafe most vendors. Other companies — notably Novell, Inc. — have taken high-profile steps that at least offer hope to frustrated managers. But several ABUI members said they felt Banyan has done too little to reduce the time it takes for a user to get answers to technical problems.

Outside the sessions, user group members said the issue has been brought up several times in the past. In fact, they praised Banyan executives for attending the annual conference knowing that contentious subjects would be brought up.

Systemhouse scores again

BY NELL MARGOLIS
CW STAFF

IRVINE, Calif. — McGaw, Inc., a $273 million medical products manufacturer with plans to grow and insufficient information systems clout to fuel them, last week signed a $4 million, three-year outsourcing and software co-development deal with Ottawa-based SHL Systemhouse, Inc.

It is not a megadeal in the outsourcing sense of the word, but last week's contract is a big deal for McGaw, said vice president and controller Rich Hirshberg. The firm's revenue, he said, has increased by some 30% since 1990. "Our goal is to double the current sales figure over the next four years," Hirshberg said. To do that, he added, McGaw has to re-engineer its entire computer setup — a melange of business and shop floor manufacturing hardware and software that suffered from minimal investment as the company careened through several ownership changes in the late 1980s.

"We couldn't do it by ourselves and still attend to our [core] business," Hirshberg noted. The idea of outsourcing McGaw's IBM mainframe operations and leveraging a systems integrator's knowledge base and technological heft, he said, was a natural step to take.

Systemhouse aced out competing bidders Power Computing Corp., IBM outsourcing subsidiary Integrated Systems Solutions Corp. and Litton Industrial Automation Systems, Inc., largely on the basis of cultural compatibility, according to Hirshberg.

The McGaw contract is the latest score in Systemhouse's blitzkrieg across the worldwide outsourcing scene: It is its 13th outsourcing deal this year and the second this month.

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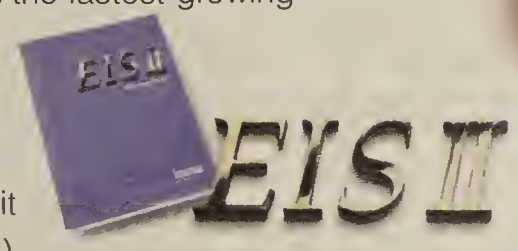

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NEWS SHORTS

Tandem CPU unscathed by bomb

Tandem Computers, Inc. lived up to its reputation for nonstop computing last week after a 100-pound bomb went off two weeks ago in London. Despite widespread devastation in the city's financial district, the Tandem system at James Capel, a stock brokerage house, managed to operate amid the rubble. Tandem is helping the company continue on other systems while the buildings are being repaired. The Irish Republican Army claimed credit for planting the bomb, which killed three people and injured 20.

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Safety in numbers

Three major loss-plagued European computer manufacturers have come together to try and grab contracts to build networks for public sector bodies in the European Community. Groupe Bull, Ing C. Olivetti & Co. and Siemens/Nixdorf Informationssysteme AG have formed Trans-European Information Systems as a first step in building compatible systems and networks for the whole of Europe. Research laboratories will be located in Munich, Germany, Paris and Pozzuoli, Italy, to check system interoperability. Target customers would be those concerned with pan-European and cross-border issues, such as immigration, pollution and health.

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TI boosts 1500 power

Texas Instruments, Inc. in Austin, Texas, last week unveiled the latest Unix-based multiprocessor in its TI 1500 line, basing the new machine on the most powerful member of Motorola, Inc.'s 68000 series, the 33-MHz 68040 processor. The new Model 1545, priced from $29,250 to $59,000, triples the CPU power of the previous 68030-based machines and can scale up to 16 processors. The new systems will be available at the end of this month. The vendor is also offering a $24,000 upgrade for current 1500 users.

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Apple cuts Powerbook prices

Apple Computer, Inc. cut prices on its popular PowerBook portables last week, reducing price tags on six of the Model 100s and 140s by as much as 27%. The price of the PowerBook 100 configured with 2M bytes of random-access memory and a 20M-byte hard disk was reduced from $1,999 to $1,499. The PowerBook 140, equipped with 2M bytes of RAM and a 40M-byte hard drive, was reduced from $3,199 to $2,699. Apple added new PowerBook 140 and 170 Models, equipped with 80M-byte hard drives.

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Short takes

Digital Equipment Corp. unveiled Pathworks Desktop Backup Version 1.0, which reportedly provides unattended distributed backup and restoration of hard disks attached to DOS personal computers on Pathworks networks. It also supports Microsoft Corp. Windows systems running Pathworks for DOS. . . . A published report claims **Xerox Corp.** Chairman Paul Allaire's compensation dropped more than 7% last year to $1.6 million, down from $1.7 million in 1990, citing Xerox's proxy report. His 1991 stock option package shrank about 70%. . . . **Scriptel Corp.** said it would work with Russian start-up **Paragraph International** to develop cursive handwriting technologies. . . . **NCR Corp.** and **Banyan Systems, Inc.** will resell each other's products in the U.S. and Canada under a pact expected to generate $25 million for Banyan over three years. The two are working to certify NCR's 3335, 3345, 3445 and 3447 uniprocessors as Vines servers. . . . **Banyan** also said Vines 4.11(5) and 5.0 will support **Microsoft**'s Windows 3.1. The company plans to fully support OS/2 by year's end. . . . **Authorware** and **MacroMind/Paracomp** have completed their merger and renamed the new entity Macromedia. Macromedia also recently announced the release of the MacroMind Director 3.1 multimedia authoring tool. . . . Boxboro, Mass.-based **Xyplex, Inc.** announced a record $12.7 million in net sales for the first fiscal quarter, which represents a 49% increase over the first quarter of last year. Xyplex sells local-area network bridges, routers, hubs and gateways. . . . Gary Holland has resigned as chief executive officer of **DataCard Corp.**

CA revamps pricing, support

CONTINUED FROM PAGE 1

whom have tired of the company's inflexible pricing and support policies [CW, March 2].

CA hopes the changes will prevent customers from defecting.

"Goodwill translates itself into greater sales," said Arnold S. Mazur, executive vice president at CA.

CA's investment savings plan, for example, gives clients a residual value, or credit for licenses that become redundant when multiple CPUs are replaced by fewer but larger CPUs. "We're returning something to the client," Mazur said.

One analyst, however, dismissed CA's overtures. Ed Acly, director of software research at Technology Investment Strategies Corp., a Framingham, Mass.-based market research firm, said he believes the new programs are an attempt by CA to "buoy" its poor customer service track record.

"It's a straight business deal from a straight business company. They're not giving stuff away," Acly said.

Another analyst had another view. "It comes down to keeping existing clientele and getting some new customers, and conveying the message that CA is willing to change and not dictate what the customers should or should not buy," noted Shaku Atre, a consultant in Rye, N.Y.

Under a new maintenance plan, for a onetime subscription fee of 30% of the current list price of a particular software product, Mazur said, users can buy into long-term maintenance plans. This "freezes" maintenance fees for an extended period while reducing annual maintenance costs by up to 40%, he said.

Analysts said the program is aimed at tying users into long-term maintenance contracts, an area from which CA derives a good portion of its revenue. This has made some users skeptical.

"Thirty percent is roughly two years of maintenance, so we would have to do a thorough analysis of what the potential paybacks would be for us," said David Earhart, assistant development manager at Legget & Platt, Inc., a Carthage, Mo.-based supplier of components for bedding and furniture.

Perhaps most intriguing is CA's downsizing program. Under the plan, for example, users can trade in their mainframe operating system software and receive credit toward personal computer local-area network software.

In addition, CA announced price increases, effective with the start of its fiscal year on April 1, that will not exceed 5% and will not apply to all products. Mazur said the price increases represent only the third such increase since 1987.

Under the new customer service structure, users are provided with a single point of contact on the new service team. The new system ensures that no single account manager is responsible for both technical expertise and customer service savvy. Though Mazur would not reveal the number of client service and technical representatives the company will have in the field, he did say that the new program charges each two-person service team with responsibility for a geographic territory consisting of 100 mainframe data center clients.

Shafer maintained that he has had a good working relationship with CA customer service representatives to date, but he said that when new account managers were brought in in the past, there tended to be a delay in responsiveness.

CA is doubling the number of service administrators to engender improved communication with customers.

Top exec departs

While CA and its employees were celebrating the opening of their new headquarters in Islandia, N.Y., one of the company's top executives was making other plans.

Anthony Wang, CA's president and chief operating officer, has resigned from the 16-year-old firm to pursue other interests.

Wang will continue with the company as a consultant and remain as a member of the board of directors. He declined to comment on his future plans.

His brother, Chairman and Chief Executive Officer Charles Wang, will assume the operational responsibilities of the 1.4 billion company until a successor is named.

THOMAS HOFFMAN

Leading the pricing parade

Computer Associates' comprehensive pricing overhaul has put the company a step ahead of its systems software competitors, analysts said last week.

CA's changes reflect the trend by user companies to downsize from centralized mainframe environments to distributed computing platforms, the analysts said. Systems software heavyweights IBM and Legent Corp. are evaluating CA's moves and are said to be considering their options. Both companies said it would be premature to comment on their plans.

An IBM spokesman did say that pricing "is a serious concern, and we're working closely with our customers on it." If there are any price changes afoot at IBM, these changes won't be made public in the near term.

For years, IBM had set the industry standard in pricing with its complex tiered pricing system. But industry observers said they believe IBM will have to amend these practices to react to customer needs and compete more effectively.

"It's something that companies like IBM and others are going to have to start doing," said David Tory, president of Open Software Foundation, Inc. in Cambridge, Mass.

Tory said the models set by hardware vendors to facilitate savings from downsizing moves now have to be carried over to the software arena. "It's like price gouging in the airline industry."

Ed Acly, director of software research at Technology Investment Strategies Corp. in Framingham, Mass., said software vendors should already be trying to take advantage of platform migrations by end users, especially vendors with a full suite of open systems product offerings, including Unix platforms.

IBM, for example, does not at this time have any program designed to migrate its MVS mainframe systems software users to Unix environments, Acly said. He noted that he expects IBM and other industry competitors to react eventually. IBM may offer a DB2 database product by the end of this year that will operate in IBM's Unix environment, AIX, he noted.

THOMAS HOFFMAN

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HEWLETT PACKARD

Sun spin-off nurtures workstation-PC links

BY MARYFRAN JOHNSON
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. moved last week to tighten its links between the Unix workstation and personal computer worlds.

Sun's lastest spin-off, Billerica, Mass.-based SunSelect, has unveiled an enhanced version of Sun's popular PC-NFS network file-sharing system and a new line of PC emulation software and accelerator cards.

"The new PC-NFS will have much broader appeal among users" than will the emulation products, said Michael Goulde, an analyst at Patricia Seybold's Office Computing Group in Boston. "For not much money, you get a lot of peer-to-peer networking abilities [from] PC-NFS."

The PC-NFS software — already installed on 700,000 PCs worldwide — allows PC users to access files and resources across local- and wide-area networks while staying within their Microsoft Corp. MS-DOS or Windows environments. PC-NFS Version 4.0, available now at $345 per user or $89 per upgrade, adds several ease-of-use features and full support for Windows 3.1 and DOS 5.0.

At Rockwell International Corp.'s Collins Avionics and Communications Division in Cedar Rapids, Iowa — a beta-test site for PC-NFS 4.0 — the new version has already eased system administration tasks and improved access to certain applications, staff engineer Michael Vossberg said. "It's made our life a lot easier," he said.

The division has about 300 PCs running PC-NFS in a tiered Transmission Control Protocol/Internet Protocol Ethernet network, with about a dozen Sun workstations acting as servers for the PCs, 10 to 12 laser printers and seven Digital Equipment Corp. VAXs.

"NFS is the glue that can stick this all together," Vossberg said.

Also announced was the SunPC line of emulation products, all scheduled to be available this Friday. They include a $695 SunPC software product for running MS-DOS and Windows applications on a SPARCstation and two accelerator cards — priced at $1,495 and $1,995, respectively — that boost emulation speed and improve graphics performance.

"I don't think Sun will sweep the PC world with this, but it will be important in making the user's job easier," said Wayne Palioca, vice president of workstation integration at Ketiv Technologies, Inc. in Portland, Ore. "Someone doing high-end solid modeling on a Unix workstation, for example, may also need to use a PC-based database. Now he won't have to keep two machines on his desk."

Ketiv, a systems integrator in the computer-aided design market, was a beta-test site for SunPC, which is an enhanced version of SoftPC from Insignia Solutions Ltd. in High Wycombe, England. "SunPC makes it easier to configure memory management and to attach communication ports to devices," said Palioca, who manages a 32-user network of PCs, Sun computers and Apple Computer, Inc. Macintoshes. "You can get E-mail from Unix and pump that over to a DOS window and send it to somebody else."

Although the SunPC software allows users to cut and paste applications between the two environments, the popular Sun OpenWindows "drag-and-drop" feature is missing. That feature allows users to drag a document to a printer icon and drop it there for printing, for example.

Palioca's firm uses SunPC to enable Unix workstations to run an in-house-developed, PC-based quote service that itemizes system components and prepares detailed proposals for Ketiv's customers. "We've made a big investment in that quote system, and it can't run on Unix. Now it can run on the workstation like it's local," he noted.

The two hardware components from SunSelect are a $1,495 SunPC Accelerator SX card and a $1,995 SunPC Accelerator DX card — both S-bus drop-in cards that soup up emulation performance to Intel Corp. 80386- or I486-class levels.

The SX card is a 16-MHz, Intel 486SX processor with a custom ASIC developed by SunSelect. The DX card is the 25-MHz version.

Sparks fly

What's new in PC-NFS 4.0?

- Full support of MS-DOS 5.0.
- Full Windows 3.1 integration, plus Windows console messaging for networkwide communications among Windows, DOS and Unix.
- VT100 terminal emulation that is 80% faster and improved PC print services.
- Easier administration and better integration with SunNet Manager and other network management hosts.
- Added features such as network browsing, icons and on-line Help.

SunSelect gives Unix NetWare ties

BY JOANIE M. WEXLER
CW STAFF

In addition to giving desktop computers a dual MS-DOS/Unix personality, SunSelect last week addressed Unix-to-local-area-network integration with its NetWare SunLink software, due to ship in August.

NetWare SunLink sits on Sun Microsystems, Inc.'s Solaris operating system in a Sun SPARCstation and connects to a Novell, Inc. NetWare LAN on one side and a Transmission Control Protocol/Internet Protocol-based network on the other.

The product is intended to allow both user populations to access a more powerful server for heavy-duty applications than that afforded by the Intel Corp.-based NetWare server, said Luiza de Ruijter, product manager for NetWare SunLink.

Cross-pollination

The need for users to blend their Unix networks with NetWare — today's most prevalent LAN — is "a huge issue," said Marc Trachtenberg, director of technology at NetLAN, Inc., a dealer in New York. He said he sees his customers' business units merging or developing cross-responsibilities for two reasons: pinched economic times and a need to make information more available companywide.

For example, Greg Hardison, supervisor of telecommunications technical services at McDermott, Inc., a NetWare and Unix shop in New Orleans, said, "Over 90% of our PC environment is NetWare." Those users will soon have to access a Unix-based financial reporting application under development. Hardison said he will approach the problem from the Unix side, as "there's not enough being done in NetWare to accommodate wide-area networking."

Users can tackle the NetWare/Unix integration from either platform. For example, Novell offers a Network File System NetWare Loadable Module (NLM) for its servers that allows users to share file and print services with Unix networks. Other Novell products, such as LAN Workplace, allow NetWare clients to run terminal emulation sessions on a Unix host.

However, Rick Villars, an analyst at International Data Corp., pointed out that while Novell-oriented LAN/Unix integration "works fine for casual use," there are performance limitations with Novell's NLM strategy that could justify dedicated, more high-performance servers.

Core of suit dismissed

CONTINUED FROM PAGE 1

from proportional fonts to the use of muted color tones and the program's file manager — infringe Apple copyrights.

He also left open the question of whether HP has the right to use the same on-screen trash can symbol that the Macintosh uses to delete information.

Those questions are expected to be addressed at a hearing scheduled for May 12.

Apple general counsel Edward Stead also noted that Walker left open the question of where Windows and NewWave "as a whole" are substantially similar to the Macintosh.

"Regardless of the license granted in 1985, Apple is entitled to protection of the overall appearance of its work," Stead said.

Stead added that Apple may ask Walker to reconsider the ruling, or it may appeal the case if it loses.

Ongoing suit

Apple sued Microsoft and HP in March 1988, charging that certain audio and visual elements of the Macintosh, including overlapping windows and the manipulation of icons, were not part of a 1985 agreement that gave Microsoft the right to use some of Apple's technology. That pact was utilized in the production of Microsoft's Windows 2.03 and HP's NewWave, which is based on Windows.

Next on the agenda

Judge Walker has yet to rule on the following:

- 23 Windows items ranging from fonts to file management.
- HP's use of the trash can icon in NewWave.
- Similarity of NewWave and Windows concepts to Macintosh interface.

Last week's ruling was a puzzling development in the lengthy seesaw courtroom battle.

Conversely, last year, Walker upheld Apple's contention that the visual elements of the Macintosh screen display are original and were not part of the technology licensing agreement that Apple inked with Microsoft in 1985.

A written ruling that will reveal Walker's reasoning and clarify the decision is expected shortly.

Although the slow-moving legal drama packs great importance for the vendors, it has yet to impact user acquisition plans.

"These courtroom dramas take so long that until I see a ruling saying Microsoft is going to recall Windows, or Apple has been severely hurt, I'm not worried," said Robert McPhee, a senior engineer in the imaging system department at Du Pont Co.

Apple officials have said the runaway success of Windows has come at the expense of the Macintosh and last month estimated that the alleged infringement amounted to $5.55 billion in lost revenue.

But some analysts have questioned those figures, noting that Macintosh sales were up 60% last year. If Apple prevails, however, it could squeeze large royalty payments out of Microsoft.

Although the case still has a long way to go before being fully resolved, Microsoft legal representatives said the ruling came as a welcome surprise for a company that is basing its future on Windows. "We're very, very pleased," Microsoft senior litigation paralegal Debra Vogt said. "We're not through yet, but it's made our life a lot easier."

Protection questions

In an effort to dismiss the case, HP filed three motions last February, asserting that the 44 elements of HP's screen under attack by Apple are simply not protectable.

HP argued then that the designs are either not original to Apple and that they are ideas rather than expressions of ideas and therefore not protectable, or they can be excluded altogether from protection under a copyright doctrine known as scenes afaire. Scenes afaire permits expression that flows naturally from an idea, such as a gunfight scene in a western movie, Marshall said.

A hearing on monetary motions is set for June 9. In the meantime, a counterclaim in which HP and Microsoft claim Apple's suit restrains trade, remains on hold.

West Coast senior correspondent Mark Halper also contributed to this report.

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SAS releases experimental version of EIS tool

BY GARY H. ANTHES
CW STAFF

HONOLULU — Stepping up to become a soup-to-nuts provider of information delivery systems, SAS Institute, Inc. this week plans to ship an alpha version of its executive information system (EIS) builder.

SAS, based in Cary, N.C., showed attendees at its annual user group conference here last week an early version of the EIS application development productivity tool, called SAS/EIS. Although reaction to the product was generally positive, users toying with the idea of arming their chief executives with desktop access to corporate information face greater challenges than software selection.

It is not easy to tailor an EIS to the personal styles and needs of managers, some users said. "Executives don't have time to do requirements-setting, and they don't know what they want," said Richard W. La Valley, senior manager at MCI Telecommunications Corp. in Richardson, Texas.

La Valley said prototyping is "almost an imperative," and any EIS development tool must allow for quick, easy changes.

Mickie Tisdale, manager of decision support systems at Bowman Gray/Baptist Hospital Medical Center in Winston-Salem, N.C., has worked with SAS to help define SAS/EIS and will receive one of seven early copies of the tool. Other early users include Quaker Oats Co. and John Deere Capital Corp.

The medical center needs an EIS that serves up information directly related to managers' "critical, measurable goals," which are tied to executive compensation, Tisdale said. The first cut at the EIS will be based not on management input but on information needs inferred from years of satisfying ad hoc requests, Tisdale added.

SAS/EIS will be used if the medical center decides to move forward with an EIS. However, an EIS presents several organizational challenges, Tisdale said, including the need to satisfy the vastly different styles and demands of medical school and hospital managers.

Tisdale said she worries about the response from the people who now provide managers with ad hoc reports from the medical center's mainframe. "We are able to spoon-feed what goes up the line. There's fear that the senior level will see data before the lower level has a chance to gloss over the cracks," she said.

Nevertheless, Tisdale said she will have to take some action on the EIS front because budget pressures are forcing a move away from "the costly MIPS" on the IBM mainframe. A new EIS would be based on a client/server architecture of some kind, she said.

Reaching out to all levels

SAS/EIS, the company's first object-oriented product, extends SAS' move beyond its roots in statistical software toward general-purpose tools for data access, management, analysis and presentation. That strategy requires adding layers of simplicity as products get deployed "at all levels of the organization, from CEO to 'Mo and Joe' turning the computer on in the basement," said James Goodnight, president of SAS.

SAS/EIS is expected to compete with offerings from Pilot Executive Software, Compushare and Information Builders, Inc. With SAS/EIS and other recent SAS products, end-user interfaces can be completely customized. "You can write a push-button environment so the user doesn't even know he's in SAS," Goodnight said.

He said most users would put SAS/EIS on workstations, using a mainframe as a corporate data server.

Serving the executive

Product: SAS/EIS, an object-oriented development environment for building and maintaining executive information systems.

Capabilities: Applications can be built by clicking on icons — for data access, analysis and presentation — defined in the package and listed as objects in the menu.

Platforms supported: MVS, CMS, VMS, OS/2, DOS and Windows.

Availability: Fourth quarter.

Pricing: First-year license fee on IBM mainframes ranges from $4,125 to $28,500 and from $2,310 to $15,950 for DEC VAXs. OS/2 costs $695 for one workstation and $450 for each additional station. DOS/Windows prices are not available.

CW Chart: Janell Genovese

This printer will still be productive when Michael becomes computer manager.

Facit's new volume printer, the Facit E950, is designed for really demanding applications. It handles round-the-clock operations at 320 lines per minute and features Facit's new FlexForce print head which can produce over 1,500,000,000 characters (that's 1.5 billion!) with no reduction in print quality.

The 8-part form handling is characterized by excellent print quality on all copies. Furthermore, the E950 provides advanced paper handling including on-demand forms delivery.

And, unlike other printers, this one is so easy to use, it's child's play. All functions are controlled via just two keys and an easy-to-read LCD display.

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ADVANCED TECHNOLOGY

TECH TALK

Picture this

■ There has been plenty of work done on teaching computers to "see" in such areas as robotics and on storing photographic images electronically. Now, researchers hope to teach computers to see and understand digitized images so that users can search databases of photos and other images based on the actual content of the image.

MIT's Media Laboratory and UK-based BT (formerly British Telecom) have launched a five-year project to develop a method to search image databases using analysis tools that do not require textual descriptions of the images.

Alex Pentland, co-director of MIT's Vision and Modeling Group, said of the project's goal, "For example, a user could show a computer a person's picture and ask it to find all the images with this person in them. The computer would then retrieve all the pictures, images and video files which contain this same face."

Robot Olympics

■ The American Association for Artificial Intelligence (AAAI) is hosting its first AI Robotics Competition and Exhibition in conjunction with the AAAI '92 National Conference in San Jose, Calif., in July. Robots will be used to prove how AI, such as perception, planning and spatial and temporal reasoning, can be brought together to make the research community aware of the technology's reality. The robots will have to perform tasks such as moving about while avoiding objects and picking up objects, according to Menlo Park, Calif.-based AAAI.

Scanners in space

■ Handheld bar-code scanners went into orbit on the space shuttle Atlantis recently. The scanners, provided to NASA contractor Krug Life Sciences by Intermec Corp. in Everett, Wash., were used by astronauts to collect data about food consumption and exercise.

Learning to live with computers

Special interest group working to bridge computer/human communication gap

BY NELL MARGOLIS
CW STAFF

Next time you are tempted to tear your hair out over the communications gap between you and your computer, spare the hair and hold this thought: Early next month, in Monterey, Calif., some 2,500 people dedicated to bridging that gap will be working together on your behalf.

When it comes to the production of computer technology that is tailored for real-world use, computer/human interface scholar Donald Norman says that it is technologists, not technology, who are holding up the works.

"From the research point of view, we know an awful lot right now," said Norman, who chairs the Department of Cognitive Science at the University of California at San Diego. Users want to interact with their computers in a natural way. The technology may be up to the job, he added, "but industry just doesn't get it."

Steve Musgrave

At CHI '92, the annual meeting of The Association for Computing Machinery's Special Interest Group on Computer and Human Interaction (SIGCHI), Norman will join approximately 2,500 SIGCHI members in a program that will plumb such diverse worlds as "Cyberpunk" science fiction, choreography, cinematography (see story below) and psychology in an effort to help those who create computer hardware and software to see through the eyes of those who use them.

Even as they meet, there are signs that the industry may be learning its lesson. A team from IBM's Yorktown Heights, N.Y.-based Thomas J. Watson research center will be in Seville, Spain, studying what goes on — and what goes wrong — between people and computers. They will watch an estimated 25,000 users a day availing themselves of the multimedia services at what IBM calls the information station for the electronic city of the future.

"We want to both serve and observe the 'mythical user,' " said psychologist Stephen Boies, the IBM research group's leader. The group plans to do this through one of the largest scale beta tests in computer industry history, involving as many as 4 million people — the number of attendees at Expo '92 World's Fair in Seville who are expected to stop by one of 33 IBM information kiosks and try out the technology. The fair begins today and will run for six months.

The fairgoers will be using some of the best technology IBM can serve up, said developer Tom Cofino, a member of the team that has spent the past two years designing and testing the stations. The stations are IBM Personal System/2s loaded with 16M bytes of memory and 1G byte of storage. Prominently absent: mice, keyboards and mainframes. As users maneuver through the touch screens and voice prompts, IBM personnel will be keeping an eagle eye out for anything that frustrates users.

Tuning in to an IBM station will allow Expo-goers to do the fair with a flair: an on-line tour through Expo '92 will be theirs for the taking, as will the chance to send messages personalized by digitized images to friends throughout the fairgrounds. They will also be able to make meal reservations, enter contests, play games interactively and keep abreast of worldwide news.

Even more significant is what the stations will provide to IBM: a hands-on chance to see what frustrations naive users encounter when interacting with computers — and the ability to act immediately on what it learns. "We have people right on-site to change the interactive transaction system that runs the Expo application if it turns out that people are running into problems," Cofino said.

Way to go, said Austin Henderson, manager of user interface architecture at Xerox Corp. and co-chairman of SIGCHI. "You can't design technology without the human side." Try to do that, said SIGCHI member John Thomas, executive director of artificial intelligence at Nynex Corp., and your users will get burned — sometimes literally. One vendor's recently released printer opens automatically from the top, he noted: a rude surprise for users who place their cups of hot coffee atop the machine.

But even the most user-aware developer, Thomas added, cannot foresee the needs of every user. For instance, he said, a high-frequency hum coming from a noted vendor's terminal went unnoticed by middle-aged corporate users. However, when it fell into the hands of a younger user base, "it was horrendous — no one had stopped to think that you lose your high-frequency hearing as you age."

Omniscience is out of the question; all the more reason, Henderson added, why awareness and flexibility in accommodating user needs are key.

Applying film theory

Hollywood's love affair with computer technology has been big at the box office for years — but computer users as well as moviegoers stand to gain from the match, according to computer/human interface scholars.

"In film, the rule is: Don't say it, show it" — and show it in a way that will draw viewers in rather than ward them off, said San Francisco-based design consultant Chuck Clanton, who is giving a tutorial on filmcraft at CHI '92. The maxim, he said, is ripe for adoption by computer designers.

An example: "The right edge of the screen is the scary edge in films — monsters come in on the right," Clanton noted. It is also the "exit edge," he said — which is why it alarms viewers to see a right-side entry. Developers, Clanton said, "can use this sort of knowledge to emphasize what you want users to see; for instance, [electronic] mail should come in from the left and leave from the right."

In fact, each of film's four main areas — "Story: Does it tell you a story you want to hear? Production values: How well-presented is the story? Camera composition: Where on the screen is the the action taking place and why? Editing: How do you transition from shot to shot?" — translates directly into software development, Clanton said.

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E N A D V A N T A G E.

EDITORIAL

A move ahead

Have you ever heard of Northern Motor Co.? Not many people have. But Northern Motor Co. in Detroit occupies a very special place in history: In 1907, it manufactured the first automobile in the U.S. with the steering wheel on the left.

You can bet that 50 years from now, almost no one will remember who first decided that windows on a screen should overlap or that choosing "File Open" from a menu bar should retrieve a file. And no one should care. It's a better way of doing things, and that's what progress is all about.

Last week, a federal judge basically agreed and tossed out the bulk of Apple Computer's 4-year-old look-and-feel lawsuit against Microsoft and Hewlett-Packard. While the case isn't settled yet — some claims were left standing, and Apple has vowed to seek a reconsideration — the move is an arrow through the heart of the campaign to establish ownership of the way a human interacts with a machine.

Taken with Borland's dismissal of the Fox Software suit it acquired along with Ashton-Tate last year, last week's action removes a huge cloud that has been hanging over the software development field.

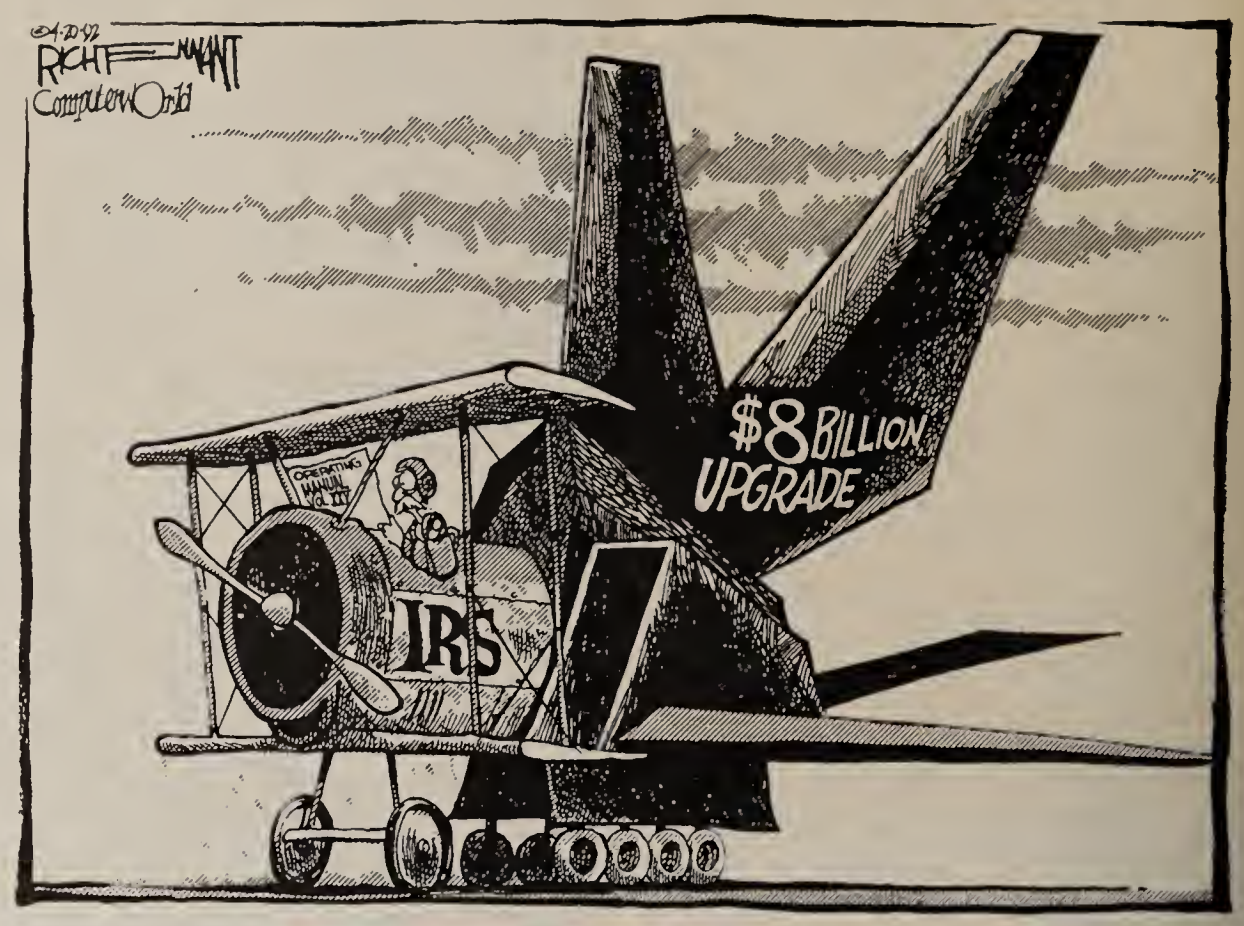
The courts are now close to drawing some clear boundaries for copyright infringement. Lotus' victory over Paperback Software two years ago showed that out-and-out cloning is unacceptable and illegal — as it should be. Now, at the other extreme, *Apple* v. *Microsoft/HP* has demonstrated that adopting and building on good ideas shouldn't necessarily be disallowed because someone else had the idea first.

It's hard to overstate the dampening effect this litigation has had on software developers in both the vendor and user communities. The issue comes up constantly in discussions with professional software developers. It is clearly in the back of the mind of anyone who decides to invest a few million bucks in building a product that might borrow some concepts from someone else.

If this decision breaks the intellectual property logjam, as many people expect it will, then users will be big winners. If overlapping windows on a screen are deemed protectable, then pop-up menus, balloon help and clicking the right mouse button are next. All are significant innovations in the battle to make computers easier to use. Forcing developers to work around them would create chaos and duplication of effort.

There are still avenues available for protecting good ideas. Patents are one emerging alternative, although a court test is also inevitable there. And copyright protection shouldn't be discounted just because it's had a couple of black eyes. Good ideas should be rewarded but not if it means having to put the steering wheel on the wrong side of the car.

Paul Gillin, *Executive editor*



LETTERS TO THE EDITOR

The catch-22 of open systems: They're open to intruders, too

Before the Michelangelo hysteria subsides completely, there's a point that should be brought up.

The two most devastating or potentially devastating attacks on computing — Robert Morris' Internet Worm and now Michelangelo — have been mounted against open systems. Unix and MS-DOS are certainly the cornerstones of the Open Systems Interconnect movement.

The shrink-wrapped software industry requires open, published access to operating system service routines. Without this access, the economics don't make much sense.

A dilemma seems at hand: how to publish the information required to sustain the personal computer and network software industry without turning our machines into someone's personal shooting gallery. It seems to be borne out that if you publish the interfaces to your memory manager, disk, screen or keyboard drivers, someone will put these to his own use. It's the same reason that automakers require ignition keys: It would be cheaper and simpler without them, but your car might wander.

Not that proprietary operating systems have not had their share of intrusions — they have. The public at large rarely hears of these, however.

Proprietary operating systems are inherently a security device. The cost of implementing them is itself a way of discouraging all but the most serious intruders. Maybe you can't run and hide from intruders, but you can probably outspend them.

Tony Michalski
Naperville, Ill.

Media caused Michelangelo hysteria

Don Tennant has some valuable things to say about the Michelangelo virus ["Michelangelo's real message," CW, March 30], but I believe he gives the unknown designer too much credit for bringing viruses to the attention of mainstream media.

I credit a small handful of antivirus vendors and "data recovery specialists" for instigating the worldwide fear surrounding Michelangelo. I also credit national/international news wires for refusing to listen to anyone but the fearmongers.

I also have to credit local newspapers and TV stations for asking computer store employees to comment about the virus threat. Those "experts" simply parroted what they'd heard on TV and read in the newspapers.

The mainstream media fed on itself and created its own experts. It doesn't need anonymous virus designers to bring viruses to the attention of the world — fearmongers can do a much better job. We'll never have adequate mainstream coverage of the computer virus threat while such a high level of naive reporting exists.

Rob Rosenberger
Barn Owl Softare
O'Fallon, Ill.

Re-engineering effort had broader scope

The Executive Report on sales automation [CW, Feb. 17] contains a section titled "Independence Blue Cross — Re-Engineering." Although I agree with the overall message of the article, two observations were omitted from the final report that I feel would have considerably clarified the situation.

First, in addition to the introduction of a sales automation system, many improvements were made to the sales process that produced a much more customer-focused approach. Those changes were made under the specific direction of the chief marketing executive.

Second, it is inaccurate to say that what we have accomplished was done "without support from the IS department." The program involved significant resources from various IS departments, such as database design and equipment installation, plus input from an outside vendor, Saleslink Technologies. Without their help, the project could not have been completed in the required time frame.

Jess Nicastro
Vice president
Independence Blue Cross
Philadelphia

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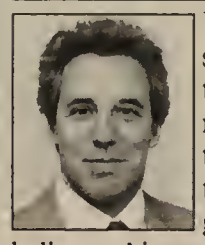
Let's eavesdrop on managers

GARY T. MARX



U.S. managers seem to believe that electronic monitoring is vital to productivity. I'd like to suggest that if they believe this so strongly, they ought to be willing to undergo the same kind of scrutiny.

Approximately 10 million American workers are already subject to secret electronic monitoring of their computer, telephone and face-to-face communications, and the sale of work monitoring systems continues to increase rapidly.

Keystrokes and time away from the computer are counted. Computer files are examined. Locations are electronically tracked. Telephone calls are listened to and recorded, and video cameras constantly roll . . . in some cases even in employee lounge areas.

'Workers shouldn't mind'

Many workers resent such monitoring. They feel invaded, demeaned and treated like untrustworthy children. Yet important segments of management argue that employees shouldn't feel this way. These managers oppose any efforts to curtail their freedom to monitor.

Advocates of electronic monitoring point to a number of benefits. Monitoring, they say, increases productivity, provides better accountability, fosters job improvement through feedback, protects innocent employees from unfair accusations and ensures better service for consumers. Compliance with laws and government regulations is improved through monitoring, they add, and the risk of litigation is lowered.

Santiago Cohen

The theory is that behavior improves because employees never know when they might be watched.

While I am certainly not an advocate of unrestrained monitoring, it does seem only fair that if, in fact, management believes these things, the same methods and technologies should be applied to managers and higher level executives.

In fact, the case for monitoring managers and executives is much stronger than that for monitoring those lower in the hierarchy, because if the former are performing inadequately or illegally, much greater damage can be done.

We might even adopt a principle that the more central a position and the higher the costs from poor performance, the greater should be the degree of monitoring.

If management is sometimes incapable of watching itself (as has certainly proved to be the case in sectors such as banking, insurance, medicine, defense contracting and environmental protection), we might consider having monitoring units made up of workers, stockholders and consumers watch the the managers who are watching others.

Turnabout is fair play

Imagine what could be uncovered if a full audio and visual record of all the job-relevant behavior of senior executives and managers was available or if their files were subject to the same oversight as those of data-entry clerks.

Of course, these managers would have to be given fair warning and guaranteed due process, and the confidentiality of their communications would have to be respected.

Furthermore, if weaknesses in performance were found, procedures violated and quotas not met, efforts would have to be made to rehabilitate these individuals through counseling and retraining.

Equity and efficiency would seem to require that invasive tactics used against the most powerless member of an organization also ought to be used against the most powerful — particularly if these methods are as effective as advocates claim. The credibility of those in management who advocate monitoring increases to the extent that they are willing to apply the same technologies to themselves.

Marx, a professor at MIT, is engaged in research on the social aspects of information technology and testified before a Senate subcommittee last fall on electronic monitoring in the workplace.

Software business practices improving, but not fixed yet

JEFF PAPOWS

In 1990, I founded the Software Business Practices Committee to improve the integrity of the software industry by promoting ethical business practices and higher business standards. In the last 18 months, we've seen progress.

I remain concerned, however, that lofty statements of strategic direction and corporate vision are often regarded as substitutes for real software products and tangible benefits. And I'm still chagrined to read about products announced before their beta testing begins.

Part of the problem stems from business ethics and questionable marketing. Some software companies have, regrettably, used very aggressive preannouncements and vaporware introductions to freeze markets while new products are being completed and tested. I am convinced, however, that most of the smoke in the software marketplace is caused not by such purposeful intent to deceive, but by inadequate or ineffective business practices.

In the crush to bring a software product to market, many companies either don't apply or lose control of the management processes and methods that allow orderly software product introductions.

Bugs in the process

Killer bugs are not limited to software code. They can be found in inadequate market research and competitive analysis, faulty or incomplete analysis of customer requirements, incomplete testing and many other parts of the business management process.

A recent study conducted by the industry newsletter "Soft. Letter" found that the average delay for late products is three months. That's at least a month too long. As long as a company communicates its schedule clearly to customers, a 60-day slip is tolerable. When a firm fails to deliver beyond this point, however, it's blowing smoke.

Software product introductions don't have to be characterized by smooth public relations outside and mad scrambling inside. When they are, it is almost always the fault of either the CEO, bad management processes or both.

Getting better

Thankfully, we are starting to see some signs of progress. Many companies do seem to be adding greater management discipline to the business of selling software, often assigning specific product managers to their product offerings.

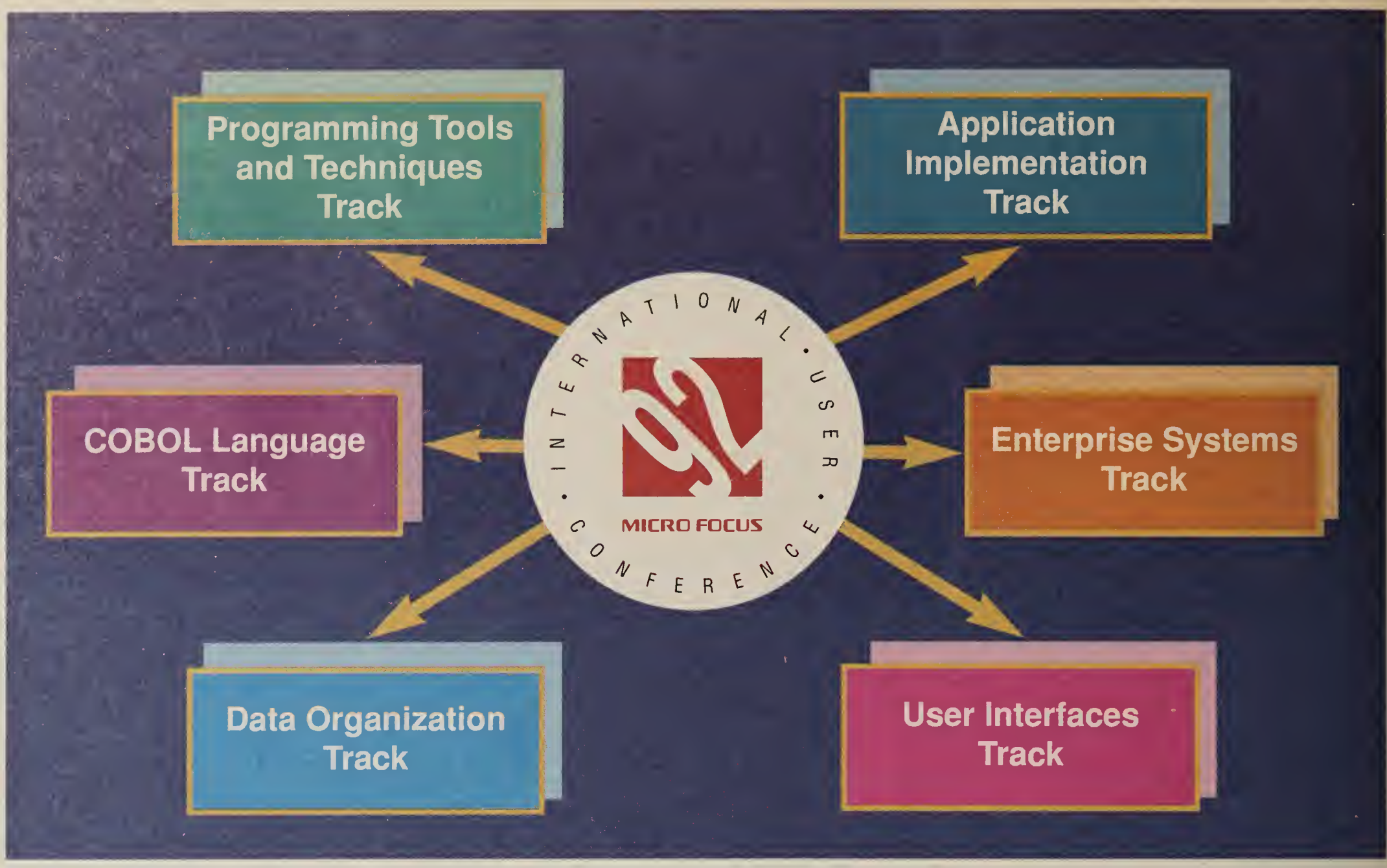
Furthermore, the "Soft.Letter" survey showed that, while top executives tend to wield the most influence over the definition of new products, customer input becomes increasingly important as the products mature. This is, at least, a trend in the right direction.

Probably the most promising sign of growing maturity in the software industry is the Information Technology Association of America's (ITAA) Quality Award program.

For too long, the software industry's discussion of software quality has been limited to a narrow technical context. ITAA's Quality Award program takes a dramatically expanded view. Patterned after the Malcolm Baldrige National Quality Award, the program places its emphasis on the entire management process of bringing software to market.

I find it particularly encouraging that this is a program the software industry has undertaken itself. Some may view it as just another award; I see it as a positive step the industry has taken on the road to greater respectability.

Papows, chairman of the Software Business Practices Committee, is president and chief operating officer of Cognos, Inc.



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IN BRIEF

Scanning in Windows

■ **Light Source, Inc.** in Larkspur, Calif., recently announced that its Ofoto image scanning software is being ported to personal computers running Microsoft Corp.'s Windows. It had previously been available for **Apple Computer, Inc.** Macintoshes. Ofoto for Windows costs $395.

■ **Claris Corp.** announced a new licensing program for its Macintosh-based software. The program features an individual user license that allows more flexibility in home and travel situations and concurrent use in network environments. Claris said it will license software to users, extending that license to other machines when the same customer uses more than one computer.

■ **Apple** has retired the Macintosh LC in favor of a Motorola, Inc. 68030-based system that exploits Quicktime and System 7.0 features such as virtual memory. Pricing for a Macintosh LC II, with a 16-MHz 68030 chip, 4M bytes of random-access memory and a 40M-byte hard drive, will start at $1,699.

IBM marshals its OS/2 forces

Marketing strategy begins with price cuts aimed squarely at end users

ANALYSIS

BY ROSEMARY HAMILTON
CW STAFF

With Comdex/Spring '92 behind them, IBM Vice President James Cannavino can retire his Olympic skier costume, and Personal Systems assistant general manager Lee Reiswig can set aside the Blue Ninja persona for now. That was only show biz, after all.

Now the company gets down to the serious business of selling OS/2, a strategy that includes a number of tactics aimed at end users.

"We are committed to mobilize every bit of IBM's resources to help the success of OS/2," said Fernand Sarrat, Personal Systems assistant general manager of market development. "We want to send a clear message that we are very serious about end users."

Plans afoot at MCI

Yet when IBM trots out a customer, it tends to be one of the company's strong corporate accounts. At Comdex earlier this month, James Zucco, senior vice president of systems engineering at MCI Telecommunications Corp., was on hand at an IBM event to discuss his plans for OS/2.

"The choice initially was simple," Zucco said. "We wanted multitasking and compatibility with the IBM mainframe world. We believe it is a key portion of our enterprisewide computing strategy."

MCI currently runs 5,000 copies of OS/2 1.3, all potential 2.0 upgrades. There are other accounts with thousands of OS/2 users are well, such as Sears, Roebuck and Co., Delta Air Lines and the Royal Bank of Canada. But they are longtime corporate accounts, which industry observers have maintained would be safe bets for IBM.

Nonetheless, Sarrat said, IBM is targeting much of its 2.0

Continued on page 34

"If we can't make it run, then we'll give you your money back."

James Cannavino
IBM
Speaking at Comdex

Alternative input tech finds its way to desktop

BY JAMES DALY
CW STAFF

Ever wonder if you and your keyboard will be inextricably linked until the end of your desktop computing days? Think again.

The field of alternative input technologies is no longer strictly focused on field-based applications running on five-pound portable computers. At least two companies are beginning to offer ways to use pen input from the comfort of your own desktop personal computer, while another has created a way to easily add touch input.

CalComp, Inc.'s DisplayPad leads the pack as one of the first pen systems designed for a standard desktop PC. Using a cordless pen on a lightweight tablet, users can write or draw information that is then simultaneously converted to text and displayed on the PC monitor. The product was introduced in January by the Anaheim, Calif.-based division of Lockheed.

A typical use for the DisplayPad would be forms-based and data entry computing. Instead of sending forms to a data entry clerk and hoping for accurate translation, the data is handwritten directly on the form that appears on the DisplayPad. This allows the user to enhance or modify the data as it is being input and verify its accuracy.

CalComp's DisplayPad *is one of the first pen systems designed for a desktop PC*

The $2,195 DisplayPad is compatible with Microsoft Corp.'s Windows for Pen Computing, Go Corp.'s PenPoint and Communication Intelligence Corp.'s PenDOS pen operating systems.

Another upcoming system that enters pen data from the desktop is the MicroPad from San Mateo, Calif.-based Infowrite Corp. Due in late summer, its function is to incorporate handwritten input, such as signatures, notations and drawings, into electronic files.

The MicroPad can also act as a signature capture device in conjunction with point-of-sale termi-

Continued on page 32

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You will also enjoy features that are not available on the mainframe. For example, SPF/2 has powerful directory search and manipulation functions. Also, HPFS long file names are supported. SPF/2 also supports 48 PF keys, automatically adapts to the various video modes (full-screen or text-window), and scrolls the file as you move the cursor. And, you will definitely appreciate SPF/2's 100% system availability, no connect-time charges and virtually instantaneous response time!

Other significant features in SPF/2 2.0 include:

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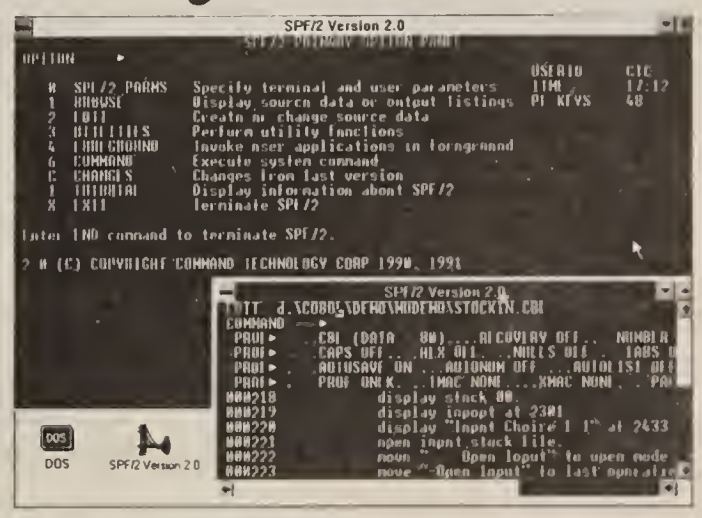
SPF/2 retails for $295. Special Multi-User Licenses are available directly from CTC for companies needing multiple copies. For details, call 800-336-3320.



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Mutual funds package networked

BY THOMAS HOFFMAN
CW STAFF

PHILADELPHIA — Packard Press, a Philadelphia-based financial printer, recently released an upgraded version of its Fund Publishing System (FPS) application software, which enables mutual fund firms to compile, edit and prepare portfolio and financial statements for shareholder reports.

The latest release, FPS Version 4.0, also provides unattended batch downloading from mainframes to personal computer networks. The MS-DOS-based software, written in Nantucket Software Corp.'s Clipper, enables users to download mutual funds data from their host accounting systems through customized programs, making FPS one of the few mutual funds software packages on the market.

"Right now, we're running FPS on Novell LANs and anything that's NetBIOS-compatible," said Fred Nielsen, FPS' product manager. He said the software works best with 80386-based PCs and workstations. FPS 4.0 also incorporates a computerized typesetting system that sets copy in predesigned formats so users can electronically send these reports to Packard for printing.

FPS users said they are optimistic about the new release. Nancy Manning, supervisor of financial reports at Provident Financial Processing Corp. in Wilmington, Del., said Version 3.0, which Provident Financial is currently using, is not nearly as flexible as Version 4.0. The company began testing Version 4.0 earlier this month. "I didn't like 3.0 at all — I felt like I was fighting it," Manning said.

Under Version 3.0, Manning said users are locked into using only one form of editing and are forced to constantly jump back and forth between menus, which annoyed her.

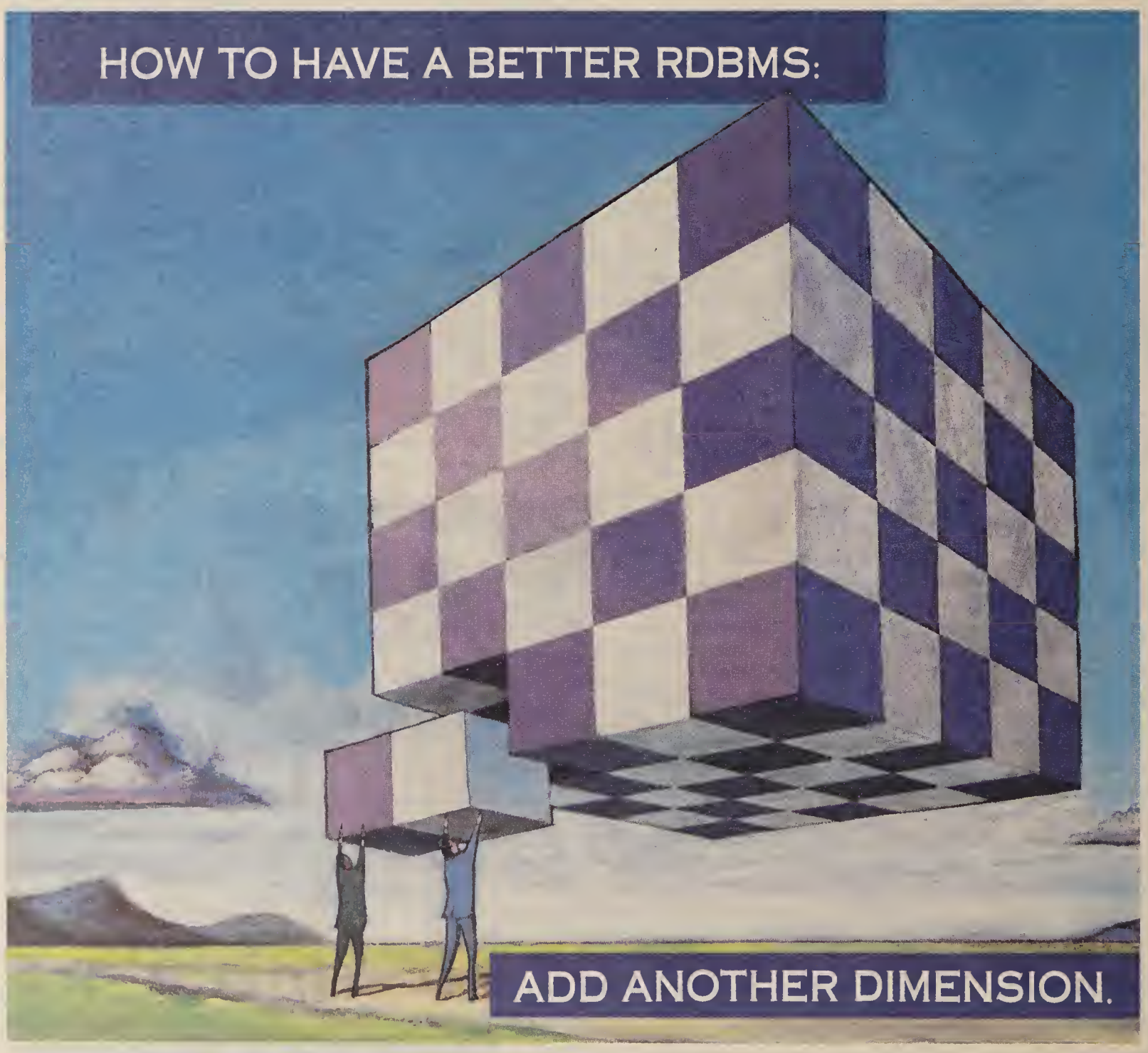
Version 4.0 has been much friendlier to work with, Manning said. "Plus," she added, "You can customize your reports to do whatever you want."

> "I DIDN'T LIKE 3.0 at all — I felt like I was fighting it."
>
> NANCY MANNING
> PROVIDENT FINANCIAL

Linda Sommerman, an administrative officer for Provident Financial, said the firm decided to buy the new release to help streamline customer service.

"We looked into FPS for the customization of client's portfolios and their needs," Sommermann said, adding that Version 4.0 should be fully operational by the middle of next month.

The license fee for FPS Version 4.0 is $1,500 per portfolio. The annual maintenance fee is 20% of the price of the license.



There are a lot of relational data base management systems running on UNIX. Unfortunately, all have one thing in common: They were based on a mathematical premise, not a business premise.

But business needs to manipulate its data differently. Businesses require extra dimensions of flexibility and ease of use.

And only one RDBMS has those extra dimensions: uniVerse by VMark.

UniVerse is a relational database management system that literally redefines the meaning of relational. It gives users greater access to and control over the data they need to deal with.

But there's more to uniVerse than its database. As an application development and execution environment, uniVerse is by far the easiest to program and to operate of any open system environment. Ported to virtually every popular open system platform in the world, uniVerse allows you to "plug in"nearly 4,000 proven business solutions, making it possible for users to be up and running in hours, rather than months.

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Alternative input finds way

CONTINUED FROM PAGE 31

nals. Digitized input is then printed out or displayed on-screen and stored for later review. The unit is also very small, weighing less than a pound and having a footprint the size of a paperback novel.

The MicroPad works with any type of desktop or portable computing device running windows. Although no firm price is set, it will cost less than $500 when it arrives, an Infowrite representative said.

Meanwhile, at the recent Comdex/Spring '92, Framingham, Mass.-based Visage, Inc. previewed a product that not only brings touch input capability to any computer monitor but can be easily installed by the end user.

Touchmate plugs directly into a computer's serial port and is simply placed beneath the monitor. There are no additional screens or sensors to attach, the company said.

Conversely, most current touchscreen products are limited to a specific manufacturer's monitor and need to be installed either during the monitor's assembly process or retrofitted later by a systems integrator.

Touchy situation

Once Touchmate is installed, the user simply touches the screen where the information is displayed. Touchmate then uses internal force measure sensors to detect how the force of a finger or stylus very slightly shifts the weight of the monitor.

Touchmate supports monitors up to 19 inches in screen size and is compatible with many brands, including models from IBM, NEC Corp., Apple Computer, Inc., Digital Equipment Corp., Sun Microsystems, Inc. and Commodore Business Machines, Inc.

Touchmate is expected to begin shipping in the third quarter. Pricing is still under final review.

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Dance troupe crew works some PC magic

Alvin Ailey's production crew springs for portable PCs to help it stay in touch while on tour

BY MICHAEL FITZGERALD
CW STAFF

BOSTON — The Alvin Ailey American Dance Theatre was in town for a week at the Wang Center recently. During the day, its production crew was working its little-known magic act: running a heavily computerized traveling ballet for a company that owns only one computer.

The trick is true grass-roots computing: If an Ailey employee wants a computer for work, he or she pays for it out of pocket. The company is not-for-profit, and budget restraints demand that it avoid capital expenses wherever possible.

Six of the 11 production and business people who travel with the show during the New York-based company's 30-week world tours have bit the bullet and bought a personal computer, all portables at this point. Several others are looking closely at the new wave of 386SX-based notebook technology, as prices drop. Crew members have been known to approach travelers with notebooks in airports to inspect their machines.

The production manager, Calvin Hunt, recently bought an Everex Systems, Inc. Tempo notebook, for instance. A number of employees also use personal organizers, such as Sharp Corp.'s Wizard and Casio, Inc.'s Boss.

The PCs are generally low-cost 286-based portable models from vendors such as Packard Bell Computer Corp. and "no-name" vendors. The systems help the various members of the production crew keep in touch with one another while they are on the road, plotting itineraries, revising lighting schemes and even updating the program.

"This company is famous for coming in in the morning and having the curtain go up that night, so we don't have time to sit down and look at ballets (and change lighting cues) — it's got to be in the lightboard already, so I can update it on the portable," said Daniel Bonitzky, lighting supervisor and resident computer "genius," as his fellow production staff members call him.

Jack Mitchell

Backing up Ailey's dancers *in works such as Donald Bird's "Dance at the Gym" are the production crew's platoon of portable PCs*

A key to keeping the distinctive Ailey look is the computerized lightboard, rented by the company for its tour. This season, Ailey will feature 26 ballets, and each theater it performs in has different lighting requirements. It typically works with a number of different designers in a season — 12 in 1992 — who will fly into the theaters and adjust the lighting for the dance, according to the theatre.

For instance, even the Wang Center's reasonably spacious stage presents an entirely different venue for dance than the open-air squares Ailey sometimes performs in, or the Paris Opera House, where the company will appear later this year. So the lighting cues must be adapted from show to show. Bonitzky uses his portable to update them on a floppy disk and pop them into the lightboard for a show. Bonitzky has specialized software that translates the DOS commands to the board.

The company also keeps each ballet's lighting cues on its own disk in case the company has to change its scheduled ballet during an intermission, due to a dancer's injury, for instance.

Operation of the system requires simple key strokes at each cue. Bonitzky said computerized lightboards are nothing new in the dance world, adding that most companies use them now. The show's music, however, remains manually operated.

Bonitzky estimates the crew's efficiency has tripled as it has added computers and databases and improved communications. He says what used to be an eight-hour unload is now done in five hours.

The troupe has an old Panasonic dot-matrix printer that "we haven't been able to kill," Bonitzky said. It gets used to print itineraries or amend the program before shows if a dancer becomes ill or injured.

While the dancers stick mostly to dance, a couple of them have learned to run the light board, and several attended training classes the company held in New York last year for WordPerfect Corp.'s WordPerfect. They also know when the computer makes a mistake, Bonitzky said. "If we miss a cue, when they come off stage, they'll let us know."

IBM marshals its OS/2 marketing forces

CONTINUED FROM PAGE 31

campaign at end users. It begins with pricing, which IBM has dropped from the previous high of $340 for earlier OS/2 versions, to a list price of $195. If a customer orders before July, further discounts are available. Microsoft Corp. Windows users can pick up 2.0 for $40, DOS users will be charged $99, and first-time users can get 2.0 for $130. Current OS/2 1.3 users can upgrade for free.

Potential customers are being encouraged to use an IBM toll-free number to order the software. The company opened its phone lines during the week of March 31 and claims to have been deluged with calls. At Comdex, Cannavino said IBM added a number of bodies to improve this service. Two random calls were made last week within a 10-minute period. The first was answered after one ring. On the second try, the caller was put on hold for five minutes before an IBMer answered.

IBM is planning 800 customer events this year at which it will bring OS/2, IBMers and third-party software companies to a customer site for an overview of the desktop operating system.

These events are separate from the 120 customer sessions that IBM is setting up by geographic regions. It held one in Chicago to coincide with Comdex, for example.

> IBM IS PLANNING 800 customer events this year at which it will bring OS/2, IBMers and third-party software companies to a customer site for an overview of the desktop operating system.

Other plans are in place to reach consumers. The company said it will work with cusumers running 2.0 on non-IBM hardware should they have compatibility problems. "If you have trouble, we will give you a hand," Cannavino said at Comdex. "If we can't make it run, then we'll give you your money back."

The company is serious about this program. It just completed work on its second clone laboratory at its Boca Raton, Fla., Programming Center where it test drives 2.0 on other vendors' equipment. Cannavino said the laboratory "cost $3 million to put together."

Gentle readers, beware flying barbs

COMDEX notes

Comdex/Spring '92 certainly was not a trade show Miss Manners would have approved of. From the operating systems titans trading slings and arrows of hype across the show floor to Comdex keynoter Michael Dell, who waded into the industry at large, there were a lot of fingers pointed derisively in competitive directions.

Microsoft and IBM led the way — singing the praises of Windows 3.1 and OS/2, respectively — and threw a few digs at each other in the process. At Bill Gates' Windows World keynote speech demonstrating Windows 3.1, Microsoft staged a radio talk show. The radio host appeared on a giant screen onstage to guide Gates and company through the demonstration. The host fielded staged calls from across the country, and Gates solved the caller's problems with various 3.1 functions. The last caller identified himself as a resident of Boca Raton, Fla., and said he was having a problem with bugs. "Bugs in Boca?" Gates asked with mock disbelief. Boca is the home of the OS/2 development laboratory.

At its OS/2 2.0 demonstration, IBM's Lee Reiswig closed by saying he had one last item to show. He then turned to the large video screen displaying the demonstration, and there was Windows 3.1 running under 2.0. This was in a window, not in standard mode as the beta-test support of 3.0 had been. IBM is not yet ready to ship 3.1 support, but it proved it could do it. Although Reiswig said IBM had just received its general availability version of 3.1, it was already up and running under OS/2.

Michael Dell's jibes were considerably more far-ranging. The chief executive officer of Dell Computer Corp. referred to IBM's Micro Channel Architecture as "technically" superior but marketably inferior. He described the Advanced Computing Environment consortium as something with "zero customer benefit and zero customer demand." He then declared the operating system wars on display as damaging to the entire industry and processor wars as over, with Intel Corp. the winner. Dell's keynote featured copious user comments, one of which targeted computing's user-baffling acronyms.

Apparently, the impending merger with Microsoft has Fox Software, Inc. in a generous mood. The database vendor is currently shipping a free upgrade for its FoxPro 2.0 relational database. Registered users can download the upgrade, a new "Run" menu that integrates several 2.0 features into an easy-to-access format, from Compuserve, or they can contact the company directly.

Compiled by staff writer Carol Hildebrand

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Quattro Pro 4.0: Improved graphics, analysis

Borland's Quattro Pro 4.0 for DOS

Reviews	Ease of use	Performance	Analysis tools	Output	Compatibility	Documentation	Support	Value	Overall
Infoworld 1/27/92	Easy to use; depth of features	Powerful	Improved auditing, problem solving	Impressive graphics	Impressive NetWare integration	NC	NC	Strong, but not a Windows competitor	Industrial-strength spreadsheet
PC Computing 3/92	Push-button speedbar easier to use	Very responsive	Improved	Impressive	Better 1-2-3 compatibility	NC	NC	Pushes the envelope	Innovative
PC World 3/92	Easier to use than 1-2-3	Runs on low-end systems	Unmatched analytical graphics features	Features added	Improved compatibility with 1-2-3	NC	NC	Everything but Windows	Best non-Windows spreadsheet
Users									
Chris Aher, MCI International, Inc.	▪▪	■■	■■	■■	■■	▪▪	■■	■■	Terrific product
David Chew, Syntex Corp.	■■	▪▪	■■	■■	▪▪	■■	■■	■■	A lot better than Version 3.0
Michael Andersen, Nationwide Insurance Co.	■■	■■	NC	■■	▪	▪▪	■■	■■	Good value, could improve installation
Roy Hinkle, Lyntegar Electronics Corp.	■■	■■	■■	■■	▪▪	▪▪	NC	▪▪	Like the graphics
Don Chase, Washington State Dept. of Wildlife	▪▪	▪▪	■■	■■	■■	▪▪	■■	■■	Good, powerful upgrade
Analyst									
Earl Rich, Faulkner Information Services	■■	▪▪	▪▪	▪▪	■■	▪▪	NC	▪▪	Viable alternative to Lotus 1-2-3

Key: ■■ Very good ▪▪ Good ▪ Fair ■ Poor

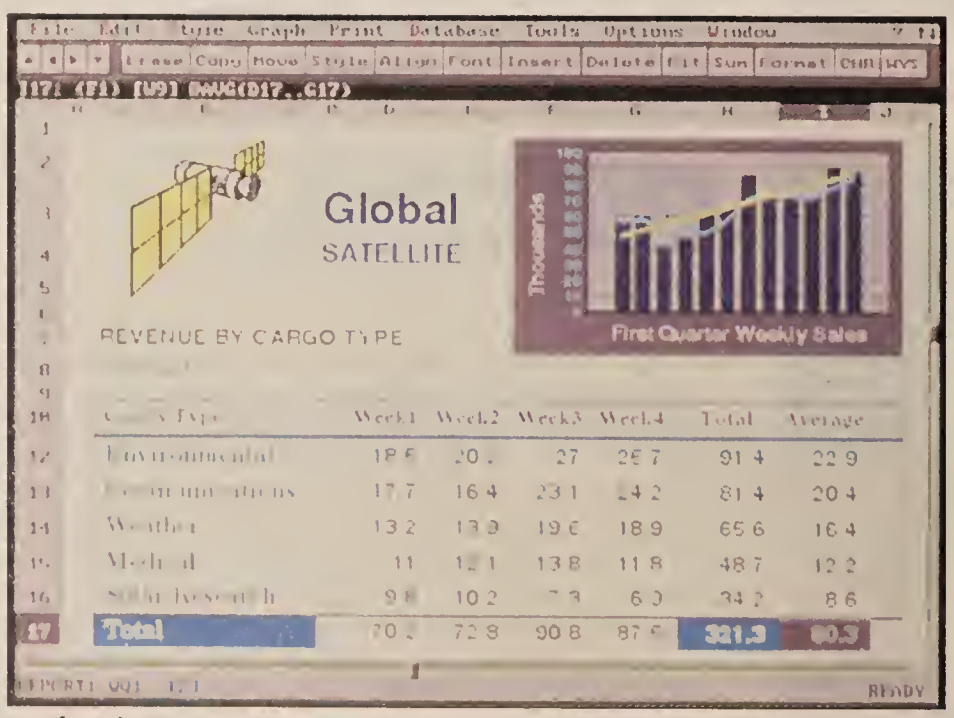
Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone surveys. NC: No comment.

Technology Analysis — A roundup of expert opinions about new products. Summary written by free-lance writer Emily Leinfuss.

Borland International, Inc.'s Quattro Pro 4.0 aims high — for a DOS-based spreadsheet that can run on very low-end machines — and, reviewers said, it gets there. The program is powerful, versatile, easy to use and goes far in offering useful graphics presentation and analytical tools. The new version has improved support for Novell, Inc.'s NetWare and offers speedbar and dialog box features for greater ease of use.

Performance: Reviewers unanimously agreed that Quattro Pro 4.0 is the strongest performer in the world of DOS-based spreadsheets, especially because it can run on any hardware starting at an 8088 with 512K bytes of random-access memory. But they suggested staying away from running the full what-you-see-is-what-you-get (WYSIWYG) display on the slower machines. Also, *PC Week* reports Quattro Pro 4.0 is slower in benchmark tests than Lotus Development Corp.'s 1-2-3 Version 3.1 but praises the product's data integrity. The program displays an error message if there is not enough RAM to perform a task, and it warns of situations where data may be incomplete.

Compatibility: The new version offers improved compatibility with Lotus' 1-2-3 file formats, including reading and writing 3.1 WK3 files. Also new is compatibility with the Allways and Impress formatting files that 1-2-3 produces. Quattro Pro can also handle FM3 formatting files from 1-2-3's WYSIWYG, which Lotus is shipping as an add-in. But there is no mention of compatibility with Microsoft Corp.'s Excel file support.



Borland's Quattro Pro 4.0, *top product in DOS-based spreadsheet arena, can run on any hardware starting at an 8088 with 512K bytes of RAM*

Output: Quattro Pro 4.0's improved network support has enhanced network printing. It offers a print manager window where users can view the network printer queue and suspend, resume or delete their print jobs.

Analysis tools: *PC World* calls Quattro Pro 4.0's new analytical graphics features "unmatched." Particularly useful is a new Auditor utility that helps users understand which data contributes to a particular cell and a linear/nonlinear optimizer that uses the same analytical engine as Excel's solver add-in. However, a drawback to this last feature is that to use the optimizer, you must enter your problem constraints into a dialog box manually, whereas 1-2-3 lets you point to a range of constraints.

Ease of use: New features in Quattro Pro 4.0, including highly efficient dialog boxes that have replaced cascading menus and, more importantly, a customizable, icon-based button bar, enhance the product's usability. Called Speedbar, this feature is an improvement on the earlier version's mouse palette. There are actually two modifiable speedbars. One is a main spreadsheet view, and the other pops up for editing cells. The net result is that users do not have to access pull-down menus as frequently and can perform more routine editing functions using only a mouse.

Value: Quattro Pro 4.0 appears to be a very good value for DOS users who do not intend to move to Microsoft's Windows, reviewers said. Upgrades are $99.95 for users of competitive products; $79.95 for users of previous Quattro Pro versions.

Vendor financial ratings

Analysts	Short-term performance	Long-term stability	Outlook
Will Fastie, Alex. Brown & Sons, Inc.	▪	■■	Good
Michelle Preston and Jeff Bernstein, Cowen & Co.	■■	■■	Very good

Borland reported 1991 revenue of $226.8 million and profits of $26.8 million, a 127% increase over 1990.

Borland responds

Marshall Moseley, product manager, Borland:

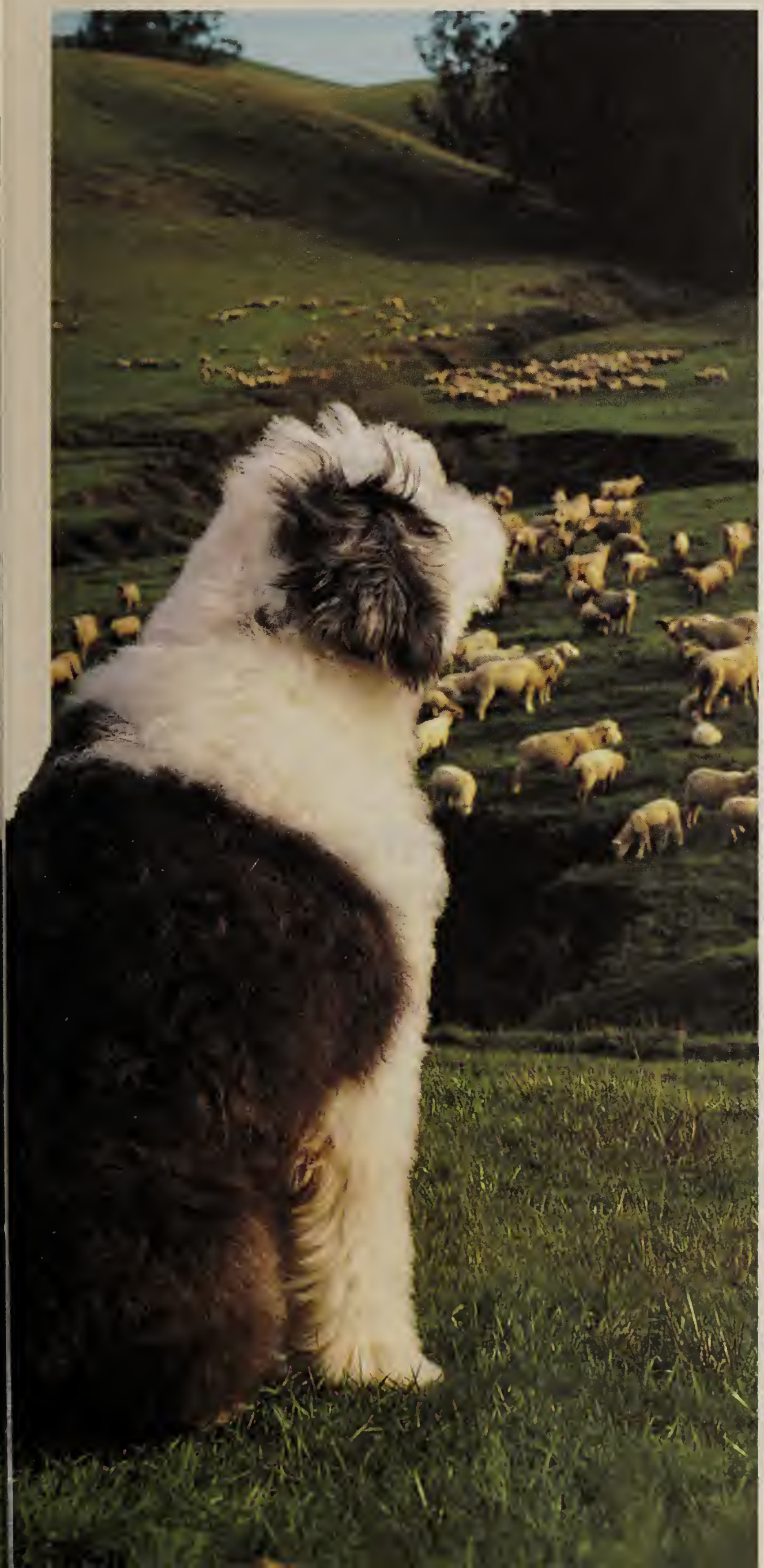
Performance: We don't recommend that people use the WYSIWYG mode on a 512K, XT configuration because it is slow. It is far more effective to use the character-based mode on that machine to do most of your work, and if you have to do formatting, flip into WYSIWYG. In terms of raw benchmarks, there are areas where Lotus is faster and areas where we are just as fast or faster. The importance of a spreadsheet is usability.

Compatibility: Quattro Pro does handle FM3 files — A *PC World* misprint said we did not. In terms of Excel compatibility, there is none right now. It is planned for future releases of the DOS product. A decision had to be made. Because our goal is to get people from the Lotus environment to ours as easily as possible, we chose to concentrate our efforts on Lotus compatibility first.

Analysis tools: Yes, to use the optimizer you do have to enter constraints manually. There is a trade-off in terms of performance vs. being able to point at constraints.

WINDOWS 3.1

▶On May 4, Technology Analysis will report on Windows 3.1, an incremental upgrade with better performance and memory management.



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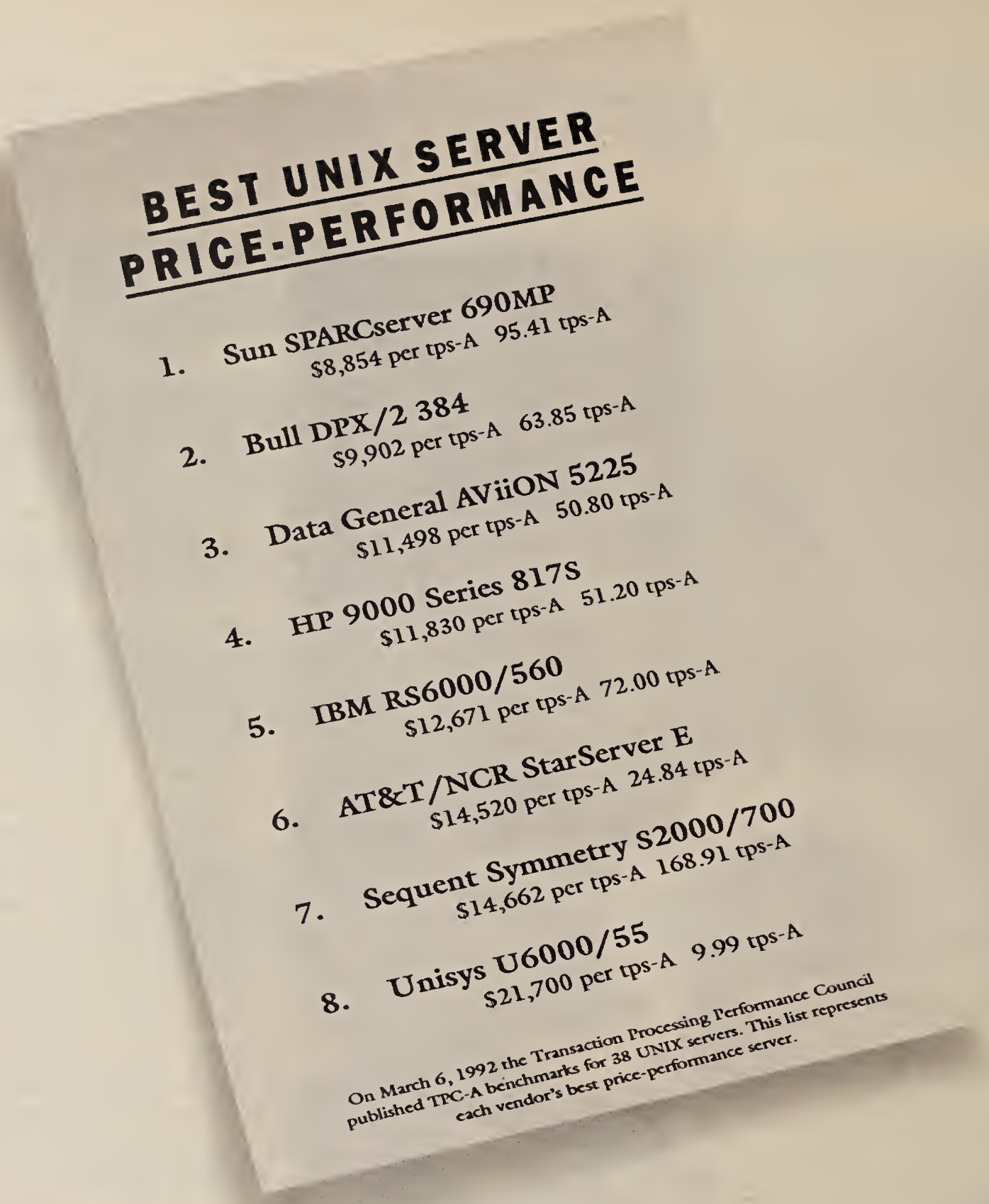

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The SPARCserver 690MP (left) is one of a family of powerful, affordable multiprocessor servers.

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Sun Microsystems
Computer Corporation

*Published by the Transaction Processing Performance Council, Benchmark A, March 6, 1992. Benchmarks achieved running Sybase SQL Server 4.8 software.

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IN BRIEF

Lynx offers Sun port kit

■ **Lynx Real-Time Systems, Inc.** is now offering core porting kits for CPUs from **Sun Microsystems, Inc., Mips Computer Systems, Inc., Intel Corp.** and **Motorola, Inc.** The Los Gatos, Calif.-based vendor hopes to propagate the latest in LynxOS operating system technology with the core porting kits, which allow developers to make the necessary hardware-specific modifications to the LynxOS kernel and develop the drivers required to port the operating system to other hardware platforms. Prices range from $25,000 to $50,000 per kit, with delivery starting this month.

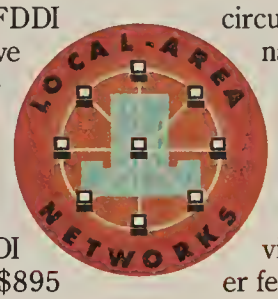
■ **Object Design, Inc.** in Burlington, Mass., was recently named an **IBM** business partner. The company already provides its ObjectStore object-oriented database management system on IBM's RISC System/6000 Unix platform and on IBM personal computers running **Microsoft Corp.**'s Windows 3.0 and 3.1. IBM is the largest user of ObjectStore.

UB shows high-speed local plan

BY JOANIE M. WEXLER
CW STAFF

SANTA CLARA, Calif. — The first smart-hub vendor to provide specifics about its plans to support Asynchronous Transfer Mode (ATM) cell-switching technology as the next-generation local-area network told *Computerworld* last week that it intends to ship a three-product family next year.

Ungermann-Bass, Inc. said it plans to add ATM support alongside traditional LANs in its high-end Access/One wiring hub via two hub modules as well as ATM desktop LAN adapter cards. The vendor estimates that the per-connection cost to end users will be competitive with that of copper-based 100M bit/sec. Fiber Distributed Data Interface (FDDI) LANs — now about half the price of a fiber FDDI connection, said Steve Diamond, UB's director of corporate strategy.



Forrester Research, Inc. said it expects copper FDDI prices to drop to the $895 cost of a 16M bit/sec. Token Ring card by year's end.

ATM is an up-to-2.8G bit/sec. cell-switching technology emerging both for LANs and in the wide area as an ultra-high-speed networking scheme that accommodates the delay-sensitive nature of voice and video. Cell switching allows multipoint networking and combines the efficiencies of connection-oriented circuit switching (no destination bits clutter the network) with bandwidth-on-demand characteristics.

While some industry analysts said they view ATM as just another feature vendors can tout in order to outdo each other in the cutthroat hub market, at least two UB hub users said emerging multimedia applications will soon justify the capability for them.

"I like looking ahead; we're upgrading our PCs with the intent for them to do multimedia," said Mike Field, microcomputer coordinator at UB shop James River Dixie Corp. in Fort Smith, Ark. "I think ATM is absolutely fabulous." Field said he envisions using multimedia for such functions as training users on new applications on their personal computers.

Doyle Friskney, director of communications and network systems at the University of Kentucky in Lexington, added: "I would like to be in a pilot project within two years" for multimedia. The only alternative to running ATM through his 60 Access/Ones, Friskney said, is "putting in a redundant network that supports just ATM. If it's in the hub, I can continue to grow my network and build on my previous investment."

Continued on page 65

High tech zeroing in on Butch and Sundance

BY MARYFRAN JOHNSON
CW STAFF

CHICAGO — Butch Cassidy and The Sundance Kid are being hounded by high tech, as the stuff of legends becomes the stuff of biomedical visualization.

Here at the University of Illinois' College of Associated Health Professions, Professor Lewis Sadler recently finished analyzing the identity of two skulls unearthed from an unmarked mountain grave in Bolivia, where Butch and Sundance supposedly met their grisly end.

Working on a donated IBM RISC System/6000 Model 550, Sadler wrote a unique software program in the C language that digitizes photographs of human faces and superimposes them over scanned-in images of skulls. Fortunately for researchers, Butch and Sundance — whose true names were Robert LeRoy Parker and Harry Longbaugh — were vain enough to leave a slew of sharply focused photographs of themselves.

Although the results of Sadler's analysis were partly inconclusive, the forensic experts investigating the deaths of the famous pair of fugitives gained some valuable clues.

This historical photo *of the Hole-in-the-Wall Gang includes Butch Cassidy, seated, far right*

"I cannot rule out the possibility that one of these skulls — the one with the large hole between the eyes — is The Sundance Kid," Sadler said. "We may not be able to identify someone with our software, but we often can eliminate questionable

Continued on page 65

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By the end of this week Computerworld readers will have spent over $24.9 Billion on Information Technology this year – representing nearly half of all IT spending to date in 1992.

COMPUTERWORLD
The Newspaper of IS

Source: IDG Research Services, Fall 1991

NetWare tool spurs third-party support

BY JIM NASH
CW STAFF

When Novell, Inc. updated its Systems Application Architecture (SAA) connectivity software recently, a raft of third-party support emerged for the product.

NetWare for SAA Version 1.2 sported seven product tie-ins when it was introduced. Such a showing typically occurs with major revisions of operating systems and hardware.

The support was one of NetWare for SAA's strong points, said Jamie Lewis, an analyst at The Burton Group, a consultancy in Salt Lake City. It showed, Lewis said, "that SAA is an application platform that can be used to integrate the mainframe and PC networks."

As for the sheer size of the showing, that can be attributed to the draw of potential rather than immediate profits. Ken Thurber, president of Architecture Technology Corp., a consultancy in Minneapolis, said the third-party response is a simple equation: NetWare plus SAA equals a large, stable base of customers.

"NetWare is the dominant PC networking system, and SAA is secure in the Fortune 500," Thurber said. The vendors "see this as a great marketing opportunity" for the future.

Demand is there, he said, but "I can't imagine that the market is going to absorb all these people." Their products largely resemble each other in function. "They position themselves slightly differently to address niche needs," Thurber said.

These products offer support for Novell's SAA software:

- **Rumba PM**, 3270 terminal-emulation software for OS/2 workstations from Wall Data, Inc. in Redmond, Wash.
- **AM:PM NetWare module**, data distribution software for linked IBM mainframes and NetWare personal computers from Tangram Systems Corp. in Cary, N.C.
- **Duet**, remote procedure call translation software for networks tied to IBM hosts from Netwise, Inc. in Boulder, Colo.
- **The X.25 Communications Interface**, an adapter linking NetWare networks to X.25 services from Newport Systems Solutions, Inc. in Newport Beach, Calif.
- **The Ethernet LAN Controller for NetWare** from Bus-Tech, Inc. in Burlington, Mass., which connects networks and hosts on Ethernet.
- **3270 Linkix**, a 3270 teriminal emulation package for Unix workstations from Cleo Communications in Ann Arbor, Mich.
- **SQLGateway/APPC for NetWare** from Gupta Technology, Inc. in Menlo Park, Calif., a NetWare module enabling network users to access DB2 databases on IBM hosts.

> "NETWARE IS the dominant PC networking system, and SAA is secure in the Fortune 500."
>
> KEN THURBER
> ARCHITECTURE
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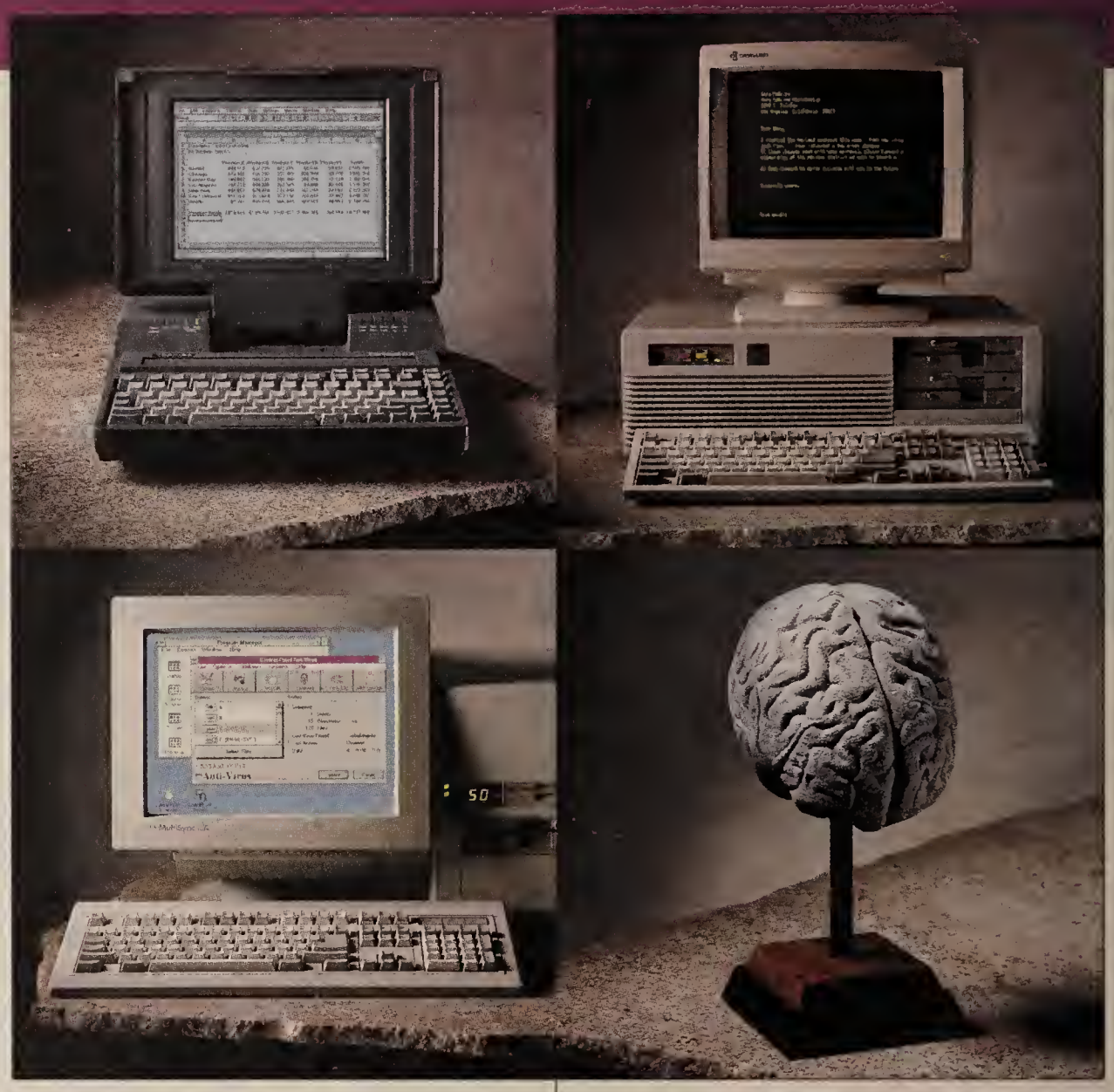

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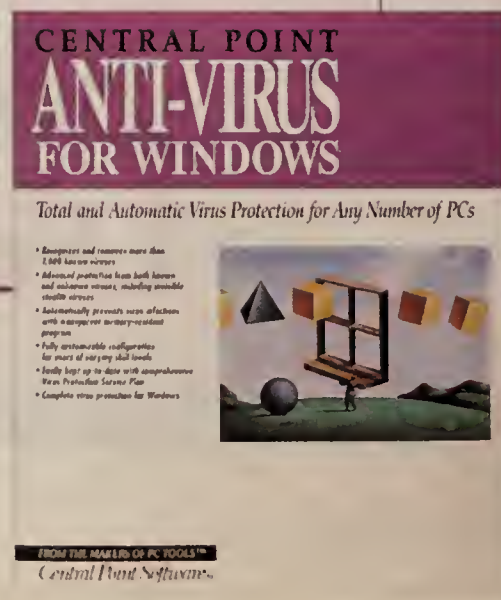

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IDC
INTERNATIONAL DATA CORPORATION

White Paper

OPEN SYSTEMS FROM AN END-USER PERSPECTIVE

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Introduction

If Hollywood ever made a movie about Open Systems, it would begin with a long distance shot of a seemingly impregnable fortress gouged into the jagged precipice of a mighty mountain. During the course of the movie, a host of invaders would repeatedly assault the fortress, bringing to bear their most formidable weapons. But each attack would be repelled.

Eventually, through the determined application of will power and technology, the tide would turn, and the great battle of Open Systems would end with victory for the conquering forces.

The real battle to achieve Open Systems may be less dramatic, but it is a battle nonetheless. Users must lead the charge by taking control of their technology futures and tying them closely to the business objectives of their organizations.

The weapons at their disposal include a widening body of standards and technology. The proliferation of standards brings with it more choices for users, who must aggressively make them and implement the results. Help in this regard is available through the many standards-related organizations that have sprung up.

The latest wave of technology can also be an ally to users. The emerging Software and Networking Infrastructure is an example. It offers a methodology for integrating the disparate islands of technology created in the wake of corporate confusion over technology acquisition during the past 20 years.

Three other significant components that are critical to the realization of open systems will also come into play. Standards-based products/technology, the open development infrastructure and management directive are all closely associated with the effort to coordinate technology and business needs.

The open systems battle rages on many fronts. It will be won by the most aggressive, resourceful combatants.

This White Paper was written independently of the *Computerworld* editorial department by John Morrell, Senior Research Analyst, and David Smith, Director, Systems & Software Research, at International Data Corporation. For more information on the content of this White Paper, or for information on International Data Corporation, please call 508-872-8200.
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F

OPEN SYSTEMS FROM AN END-USER PERSPECTIVE

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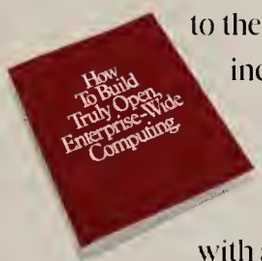

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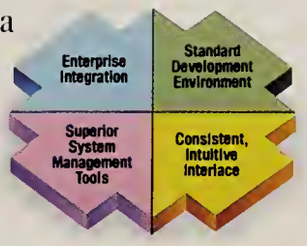

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view of both the technology and business objectives of their organizations.

From the vendor perspective, it is difficult to justify the investment necessary to engineer, market and deliver open systems technology components. Vendors need to see that users have stopped buying closed products and have started buying open products. The decision to invest in building open systems products is particularly difficult for vendors of closed products.

A BRIEF HISTORICAL PERSPECTIVE

IDC believes that information systems have moved essentially through three technology waves, each associated with specific hardware advances: the mainframe, the minicomputer and desktop computing. Each of these technology waves has contributed specific benefits and capabilities that have helped automate business functions.

The mainframe came first, automating corporate-wide functions. Next came the minicomputer, which was cost-effective enough to meet the more specific needs of departments and small-to-medium-sized businesses. The PC revolution advanced personal productivity through spreadsheets and word processing, allowing technology to shift the solutions directly to individuals and away from organizations.

Each of the technology waves was isolated from the others. There was no cohesive way to integrate them. As the hardware and software platforms shifted, new knowledge was required to integrate them. Meanwhile, the software and personnel assets companies required to utilize and manage all of the acquired platforms grew exponentially. The result was islands of automation with no mechanism to unite them and realize their full potential on an enterprise-wide basis.

As each new technology wave brought down the cost of implementation, information technology became individually accessible to more diverse areas within organizations. Empowered with the ability to make their own purchases, individual departments, and then workgroups, acquired more and more technology. Divisions and departments bought minicomputers and allocated staff to develop and maintain proprietary applications. Workgroups followed suit with PC LANs.

This decentralization occurred in many cases without an eye toward potential overall organizational benefits. Without centrally promulgated purchase guidelines, individual groups often invested with blinders on. The result is the mass of incompatible systems, software and networks in glaring evidence at many organizations today.

Even the vendors that encouraged this technological feeding frenzy are now at risk. The mainframe market grows, but only slowly because in many cases users are trapped by their mainframe heritage. The midrange market is flat. Many look to Unix as a midrange savior, but it remains largely a replacement for proprietary systems driven to extinction by the lack of an installed base.

Finally, the desktop market, which includes PCs and workstations, is slowing down to single-digit annual growth. All these markets are slow for two reasons: the functions their technologies could individually automate are exhausted and the rate of investment in them has leveled off.

SOFTWARE AND NETWORKING INFRASTRUCTURE

IDC sees a fourth technology wave developing during the 1990s: the Software and Networking Infrastructure. Many companies will invest tremendous resources installing these corporate-wide infrastructures integrating islands of automation and reinstating control of MIS. It will be much easier developing these sprawling Software and Networking Infrastructures in an open systems environment.

Just as the Software and Networking Infrastructure will be facilitated in an open systems environment, the still-emerging client/server computing environment will blossom within Software and Networking Infrastructures. This is because this fourth technology wave will make the cost of creating, developing, and managing a client/server environment acceptable to most organizations.

UNDERSTANDING OPEN SYSTEMS

The concept of open systems is wide-ranging and subject to interpretation. On the technical side, it includes network protocols and Application Program Interfaces (APIs). On the business side, it means unimpeded information access. The varied nature of open systems is attributable to the complexity of the Information Systems (IS) value chain. Users look at open systems from the perspective of their information and workflow environment. Hardware and software vendors consider open systems in terms of the technologies they can supply. Caught in the middle is IS, which has to view open systems in the widest context — from the vantage point of vendors, to users, to management.

In an effort to better define open systems, some equate it with Unix. They rationalize this by saying that Unix offers inexpensive solutions, portable software, interoperable applications and vendor independence. Despite these claims put forth by a small number of Unix purists, Unix is not an open systems panacea. If open systems only imply standards compliance, then many systems are open. However, these "open" systems fail to ensure the long life and usefulness of IT investments that truly open systems will offer.

FOUR GENERATIONS OF COMPUTING

Technology Wave	Primary Benefits	Targeted Audience
Mainframe	Initial data collection and automation	Central corporate
Minicomputer	Second-level functions and small business	Departments and small business
Desktop	Personal productivity	End-users
Software and Networking Infrastructure	Enterprise-wide integration	MIS

SOURCE: International Data Corp.

Each of the first three computer waves was geared toward a particular hardware platform. The fourth wave aims to eliminate this hardware focus and utilize all corporate information technology.

The open systems world must leave room for innovation. If all open systems technology were governed by strict standards, where would the next technology wave come from? The fact is, most users agree that they are not seeking an environment where every component looks the same, but rather one where all their information technology can exist cohesively.

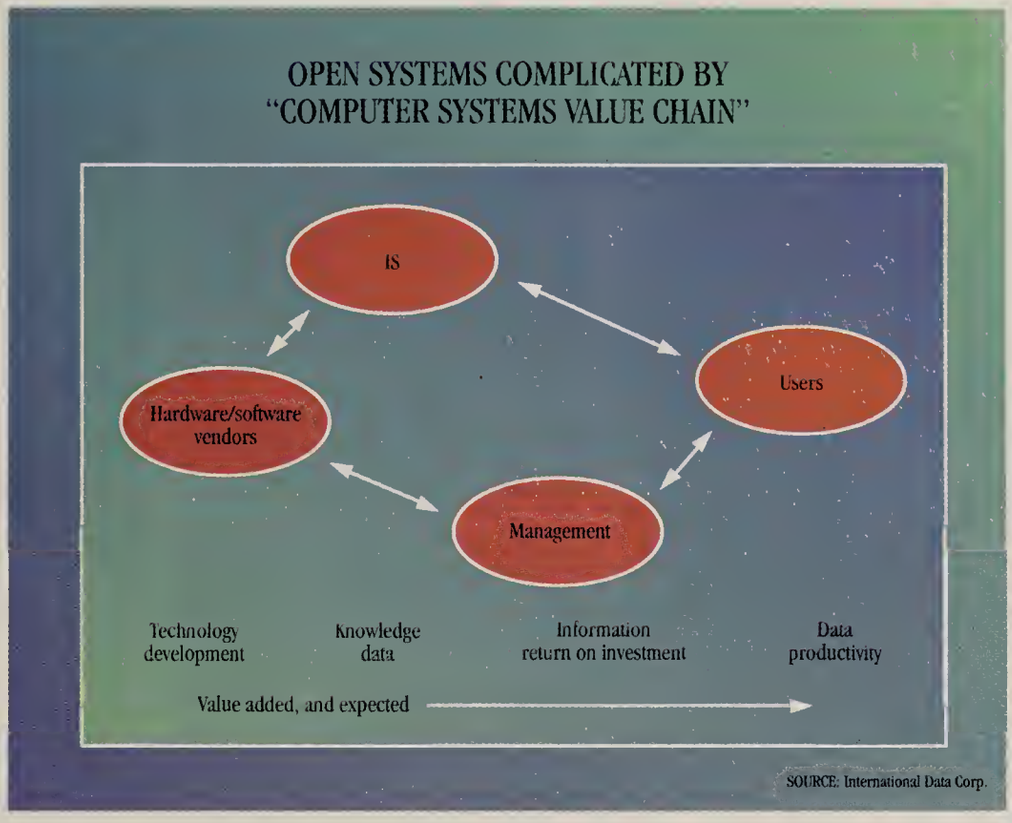
Open systems are built by organizations that rely both on business and technological acumen. Vendors and standards bodies may define open systems in their own ways, but only users know what technology is relevant to their set of problems.

If information technology is to run through the mainstream of organizations, it must be governed by the same kinds of rules that govern people. When a person is hired, certain qualifications must be met and certain guidelines followed. The same should be true for information systems.

IDC believes open systems is a methodology information systems implementors will use to create a flexible environment that will allow business problems to be solved in a manner that benefits the entire organization.

Three interdependent components are required to create a true open systems environment:

- standards-based products/technology
- open development infrastructure
- management directive.



The diverse interpretations of open systems are attributable to the complexity of the computer systems value chain. Vendors, management, users and IS all view the concept in terms of their own needs.

Standards-Based Products/Technology

This component is the subject of most of the open systems hoopla, even though it is just one part of the story. Standards-based technology provides such features as interoperability and portability.

When most people think "open", they also think "standards". "Proprietary" is another word that is frequently mentioned during conversations about standards. In most cases, it is taken to mean the opposite of open. In reality, the opposite of open is closed, not proprietary, and closed technologies are what lead to dead-end IT investments.

To foster innovation, there will always be, at some level, certain proprietariness in any implementation. The key is to balance the risk of proprietary technology with the level of innovation required to implement an information systems solution. Utilizing standards minimizes the risks of proprietary solutions by limiting exposure to closed-ended products; but the scarcity of standardized technology may also restrict innovation.

IDC predicts a continual growth of new standards. One result of this process will be an increasing number of APIs linking different products that will in turn provide functionality at different levels.

The standards development process typically takes a "fill-in-the-puzzle" approach. Standards exist at different hardware, operating system, network, and software levels, but still do not provide a complete solution. In some cases, no standard exists and in other cases, multiple standards exist.

Open Development Infrastructure

This component is the key to ensuring the long life and usefulness of each technology implementation. The open development infrastructure is needed to ensure that information technology is implemented in the most effective possible way for the largest possible user audience currently, and in the future.

In a true open systems environment, the application of information technology will incorporate previous technology investments, allowing them to be integrated with their newer counterparts. At the same time, these newer technologies must be open to the technologies that succeed them.

While standards provide the assurance of software and hardware continuity, the open development infrastructure makes sure that these standardized products are properly applied to the IS environment.

In order to maximize the benefits of open technology, the open development infrastructure approach requires discipline. It is very easy to fall into the trap where closed applications lacking portability and interoperability are built upon open systems. For instance, a user could buy a standardized database product compatible with industry-standard Structured Query Language (SQL) capabilities but negate its standardized nature and portability by adding nonstandardized extensions. It is also easy to end up in a situation where incompatible networks spring up throughout an organization because users are upset about being left out of the development process. These ad hoc networks may soothe egos and solve

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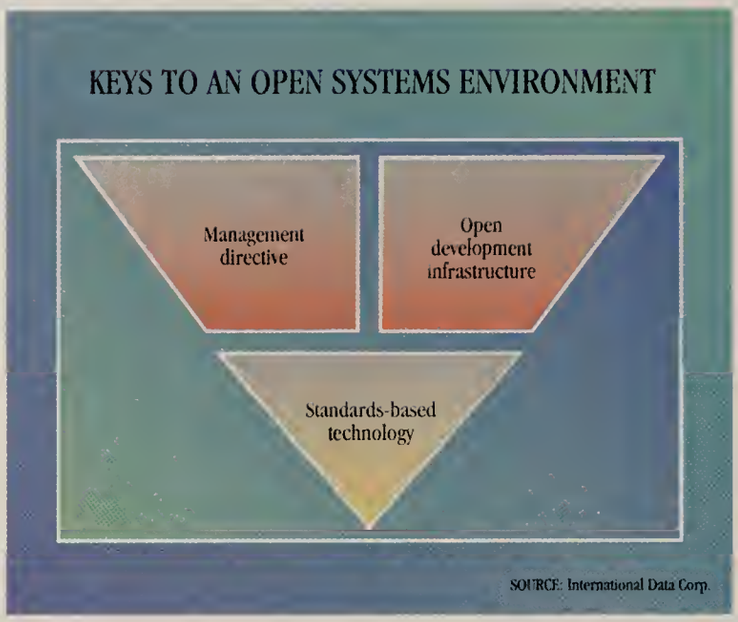
short-term problems, but they will haunt their organizations at some point in the future.

The open development infrastructure should ensure that the needs of all groups are addressed, while solving their problems in a manner consistent with the goals of the organization.

Management Directive

This component is required to make the technology serve the business as opposed to being implemented in a scattershot fashion. Without management directive, islands of automation will continue to exist and information will be used as a weapon by groups with individual purchasing authority, but not for the organization as a whole. Management directive must ensure that products are bought with the greater good of the entire organization in mind. Issues ranging from the content of RFPs, to gathering end-user requirements, to the actual purchase and use of technology must be addressed.

The management directive must result from a consensus of all the groups with a vested interest in the IT infrastructure. This consensus-gathering process becomes increasingly important as companies decentralize their decision making processes.



IDC's view of the open systems environment emphasizes adherence to technology standards, but is highly dependent on organizational initiatives.

REALIZING THE BENEFITS OF OPEN SYSTEMS

The benefits of open systems will vary for MIS, management and the end-user.

MIS

The most tangible benefits of open systems will be experienced by MIS. Specifically, these benefits will be found in three general areas. The first includes increased productivity and faster user response. The second is better control of the IT environment. The third is cost control.

Open systems will exponentially increase the productivity of programmers, analysts and staff because of the portability of skills it fosters. In an open systems environment, commonality of development environments and management schema will provide MIS with one set of skills across its entire staff.

The presence of an integrated, open standards architecture means that new applications do not have to be reengineered from the bottom up. This will free MIS personnel to perform other tasks. New application development and user requested changes will thus be handled in a swifter fashion, reducing the lag time experienced by users.

In addition, open systems will bring a greater sense of control to MIS from both technology and management perspectives. The predictability of open, standards-based environments will afford MIS management the ability to allocate resources and manage change in an optimal fashion.

Management

The advantages open systems will offer management are threefold. The first advantage includes less emphasis on technology and more on business. The second is smoother IT investment streams. The third will be a more flexible IT structure that can change with business needs and objectives.

When implemented properly, open systems will return management to a more ideal world where it can apply its skills to the business operations of the company. The idea is to allow managers to simply utilize their IT investments without them having to manage the process of making them all work.

Since systems, software, training and development expenditures within open systems will come in manageable chunks, IT planning will be more accurate. Management will be able to plan IT investments in a smooth, incremental fashion, taking a longer term approach to the return on these investments.

Open systems will also bring with them an environment that is inherently flexible and transportable. As organizations shift roles, or as new divisions are created to tap market opportunities, applications, data, and systems will be able to move with them or be added easily.

The End-User

As stated, the realization of open systems will bring unimpeded access to information.

In the past many end-users resisted the advancement and proliferation of computer technology in the workplace. Although there are many emotional reasons for such resistance, in a clinical sense, it constitutes a failure to seamlessly integrate the technology at hand with the job requirements.

The end-user's job should not have to worsen based on the spread of information technology; it should be enhanced. With open systems, new opportunities will be presented to the end-user, who will be able to perform them without having to understand the technology driving them.

Today, certain dividends are paid to the person who understands how to navigate the network, reach the mainframe and utilize the cryptic report writer to disseminate information from corporate databases. When open systems are implemented, information will be available in a more egalitarian fashion which will allow all users to employ it productively within their organizations. Organizations will be well served if the users accessing this information understand how to link that information with business objectives.

ORGANIZATIONAL ISSUES

There are many barriers facing the successful adoption and implementation

of open systems within an organization. While many are technical, IDC believes many others are organizational. Much work in identifying these organizational barriers has been done by the User Alliance for Open Systems, an arm of the Corporation for Open Systems, International (COS).

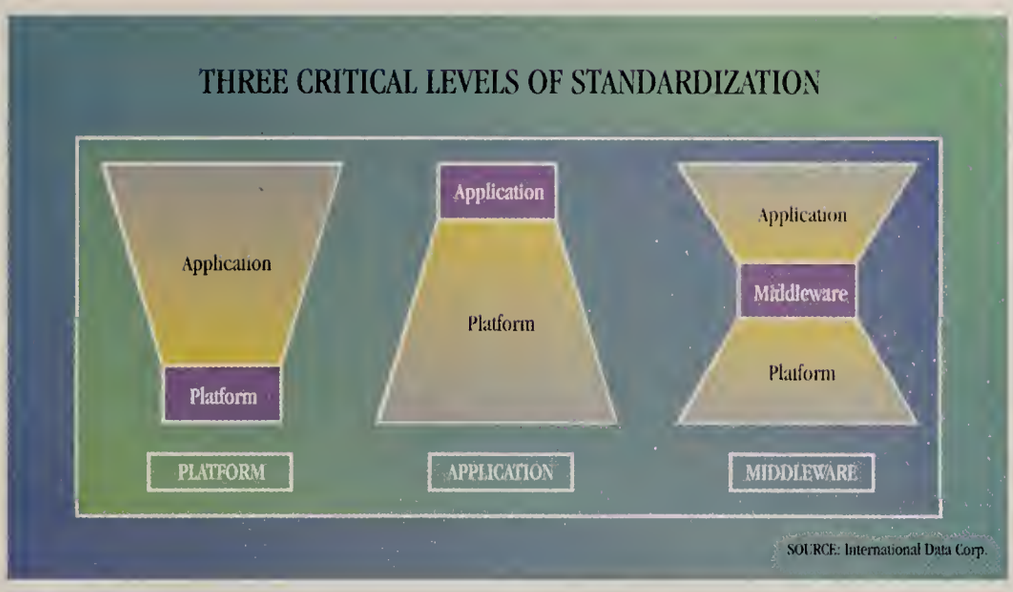
One mission of the Alliance is to overcome barriers to the successful implementation of integrated business information system environments. In its "Overcoming Barriers to Open Systems Information Technology — First Official Report," known more informally as "The Barriers Document," the Alliance identifies nine barriers to open systems implementations and formulates action plans to attack each of the barriers.

The Alliance has done an excellent job articulating these nine barriers. They are:

1. The user community lacks a process to identify common requirements for open systems.
2. The user community lacks a vehicle to exert collective leverage to cause vendors to implement common requirements.
3. Resources invested in systems and applications, and the attitude and culture of the work force, make it difficult to evolve to an integrated business information environment.
4. There are insufficient open systems.
5. Current business practices encourage a short-term approach to solving business problems while ignoring long-term integration issues.
6. There is no perceived linkage between the implementation of open systems and accomplishing business missions and objectives.
7. There is a fear of being unable to compete using open systems, causing an unwillingness to change.
8. There is no documented, coherent North American "vision" of broad-based enterprise integration and the role open systems play in achieving that vision.
9. There is no shared vision for developing an open systems process.

Note that with the exception of barrier number 4, the barriers are organizational in nature.

Among technical problems that do exist, one of the most intransigent is the issue of updating legacy systems. The considerable investment in these systems is composed of hardware, system software, application software, networks and the less tangible elements, expertise and training.



Standardization can occur at the platform, application and middleware levels.

Users find it difficult to migrate to more cost-effective systems because critical day-to-day business applications must stay up and running. Making matters worse, in many cases, software cannot be rewritten because original source code is either lost or too poorly documented.

STANDARDS TRADE-OFFS

IDC believes that systems are composed of technologies at three distinct levels: standard hardware and software platforms, applications and middleware. Standardization is taking place at each of these levels.

Standard Hardware and Software Platforms

This is the model adopted by the PC market. Standardization has occurred on Intel x86 hardware using MS-DOS and Microsoft Windows 3.0 as the operating environment. This has fueled the availability of large numbers of applications in response to the immense market demand.

The result has been incredible choice in applications but little choice of hardware and operating environment, which has caused a drag on productivity.

Standard Applications

Users who standardize on specific applications generally do so to ensure interoperability between work groups. These users are limited to running their chosen applications on specific hardware and operating environments. Locked in this mode, they are unable to take advantage of competing applications.

Middleware

IDC defines middleware as software that resides between an application and an operating system/platform. In the past, middleware has often consisted of proprietary layers of software.

Today, its most common forms include: information management (databases, repositories, etc.), presentation management (graphical user interfaces, forms management, printing services, etc.), communications (remote procedure calls, messaging, E-mail, document linking services, etc.), management tools (notification, fault detection, recovery coordination, accounting, encryption, authentication, etc.), and software development tools (code generators, debuggers, upper and lower CASE tools, etc.).

With the recent emphasis on open, standards-based technology, middleware is evolving to become more platform-independent and to use standard protocols and interfaces when they are available and mature. IDC expects this trend to continue. It should be noted that middleware is an entity, not a part of applications or platforms.

There are also many examples of middleware that are not based on standards. There are times when it is appropriate to utilize such non-standardized technology. For instance, if proprietary technology solves a business problem and if there is

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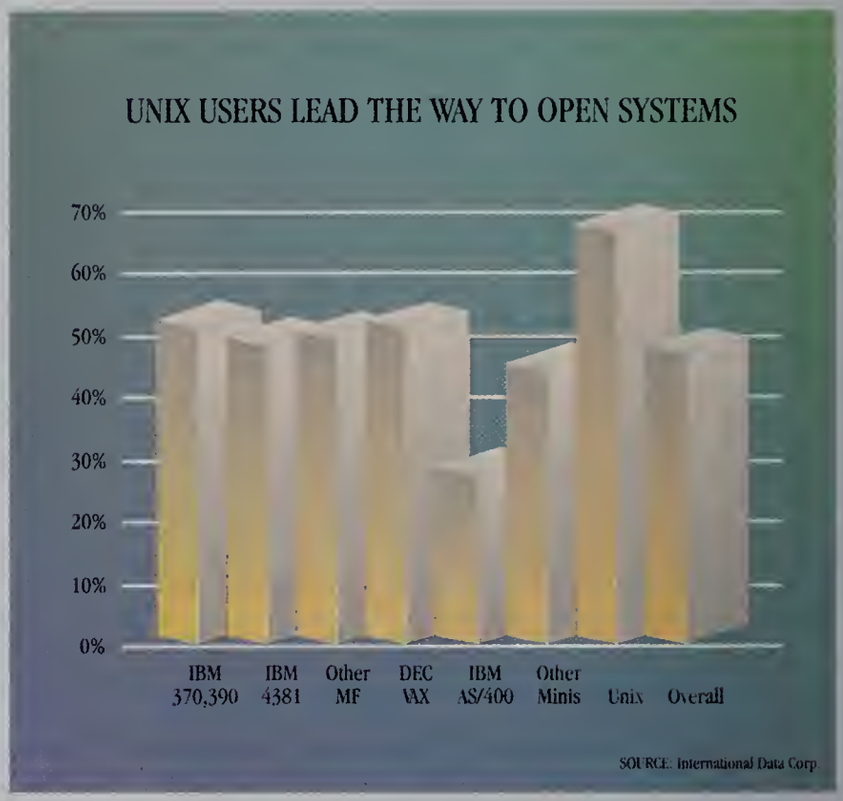
THE OPEN ADVANTAGE.

Users Reveal Their Ideas of Open Systems via IDC Study

Much of the debate around open systems is the result of the many different definitions that explain the concept, and the positioning of many products as being "open systems". IDC believes that open systems is not a single, tangible product that one can buy, but instead a set of methodologies by which information systems are put together.

Since every MIS shop has its own unique set of problems, it will solve them with its own information systems structure. Because of this, open systems will be defined by each organization in a method that describes their specific goals and needs, creating a myriad of definitions, none of which are wrong. Yet, no matter how it is defined, users are ratifying the concept of open systems more than ever.



Almost 70% of Unix users surveyed say their organizations are pursuing an open systems strategy.

DETERMINING STRATEGIC PLANS

Nowhere is the movement towards open systems more evident than in the results of IDC's 1992 IT Strategy Directions and Spending Patterns survey. The purpose of this survey is to measure on an ongoing basis the strategic issues facing MIS organizations and their plans for acquiring information systems technology. Close to 1,600 mainframe (IBM and other) and midrange (IBM, DEC, Unix and other) systems sites responded to the survey, detailing their plans for IT investment.

One question in the survey is: "Is your organization pursuing an open systems strategy?" The response to this issue shows high levels of interest in open systems. Almost 47% (46.9%) of the total sites surveyed claim to be planning or implementing a strategy for open systems within their organization.

Not surprisingly, Unix midrange system sites were most active with open systems, with 65.6% of the respondents answering "yes" to the question. Interestingly, IBM 370/390, IBM 4381, other mainframe, and DEC VAX/VMS sites also showed remarkable interest in open systems, with each group having close to half of the respondents actively pursuing open systems. Little interest was seen in the IBM AS/400 and System 36/38 base, where only a little over a quarter (27.6%) of the sites claimed to be moving towards open systems.

EXPLAINING THE LACK OF INTEREST

Why do some sites show no interest in open systems? One explanation could be the old adage, "if it ain't broke don't fix it." Some sites currently have their IT structure fully under control, and see no reason to institute change. Their current vendor or set of vendors is providing a steady stream of useful technology enhancements that enables the majority of IT related issues to be solved in a relatively simple manner.

Another explanation could be that some believe open systems is just a pipe dream, and do not perceive any benefits open systems may bring about. A third possible explanation could be that some sites are bogged down with so many problems today (application backlogs, limited staffing, etc.) that the time to investigate or develop an open systems strategy does not exist.

Some of these sites may never need to institute an open systems strategy, while others may just be waiting to see the tangible benefits brought forward in an open forum.

WHAT MEANS TO AN END?

The second interesting question was asked of sites who respond that they are pursuing an open systems strategy: "If you are pursuing open systems, by what means?" The respondents were given four methods to choose from, with multiple responses allowed:

- a standardized operating system
- an enterprise-wide communications system
- common development tools, programming languages and database software
- other.

The methods of implementing open systems are varied among user sites. Of the overall sample, 50% of the sites rate a standardized operating system as the vehicle implementing open systems, while slightly over 40% vote for common

tools, languages and databases. Surprisingly, only a little over 23% are implementing open systems via enterprise-wide communications mechanisms.

ANOTHER PERSPECTIVE

However, if you break the sites into three categories, mainframes, proprietary minicomputers, and Unix minicomputer/server sites, the responses take on new meaning. The Unix sites are heavily weighted towards standardized operating systems (70.5%) with some interest in using common tools, languages and databases. The rationale for this is quite obvious: most Unix sites associate the portability and interoperability provided with Unix with open systems.

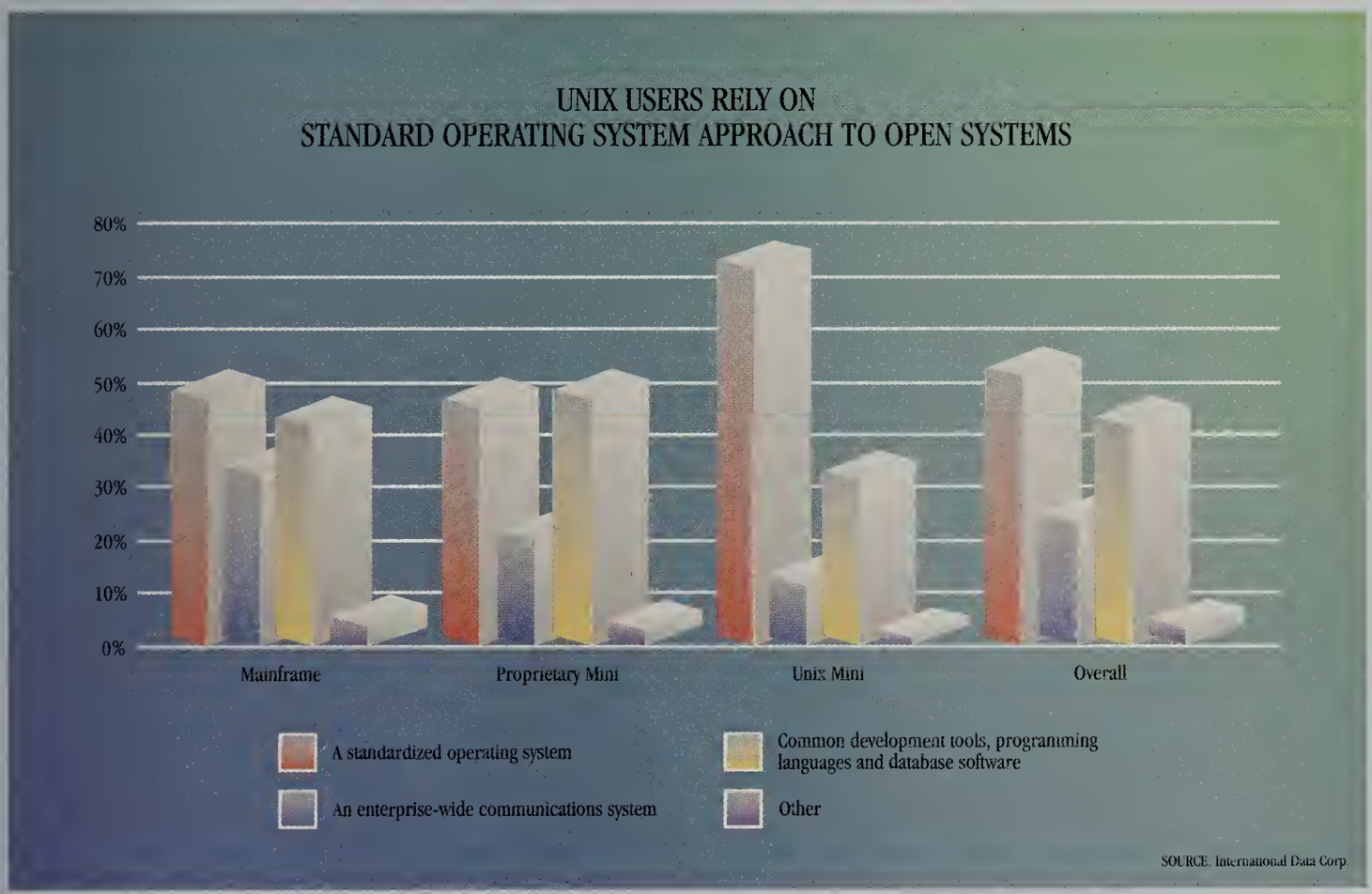
The methods for implementing open systems change radically in the mainframe and proprietary minicomputer sites. While standardized operating systems are still relatively important in the mainframe sites (45.8%), enterprise-wide communications play a much larger role (32.4%), and common tools and software (41.5%) are also rated slightly higher than at Unix sites. Proprietary minicomputer sites similarly see less interest in using standardized operating systems, and have even greater numbers than mainframes using common tools and software (46%). An above average number use enterprise-wide communications (20.3%).

ANALYZING MULTIPLE RESPONSES

A final revealing set of statistics from the responses to this question is the number of multiple responses. Over eighteen percent of the overall sample list more than one of the four methods to implement open systems, with close to one quarter (23.4%) of the mainframe sites giving more than one response. To these sites, open systems means standardizing on multiple components within an architecture to gain the most flexibility and leverage. Obviously, the best solution for them is a mixture of available technologies.

The overall theme brought forth from this set of survey respones is that there is no one technology or method for implementing open systems. Different sets of users are instituting their own policies to ensure the continued life of their IT investments in a mechanism that is unique to their own IT infrastructure.

What do the results of this survey tell us? Although it is easy to rely only on the numbers and ignore their meaning, the best conclusion to draw is that open systems involves users controlling the destiny of their information technology. Users are the ones defining open systems. They do so according to individual needs and will spend their IT budgets according to the policies and infrastructure they have pieced together. Isn't that what open systems is all about?

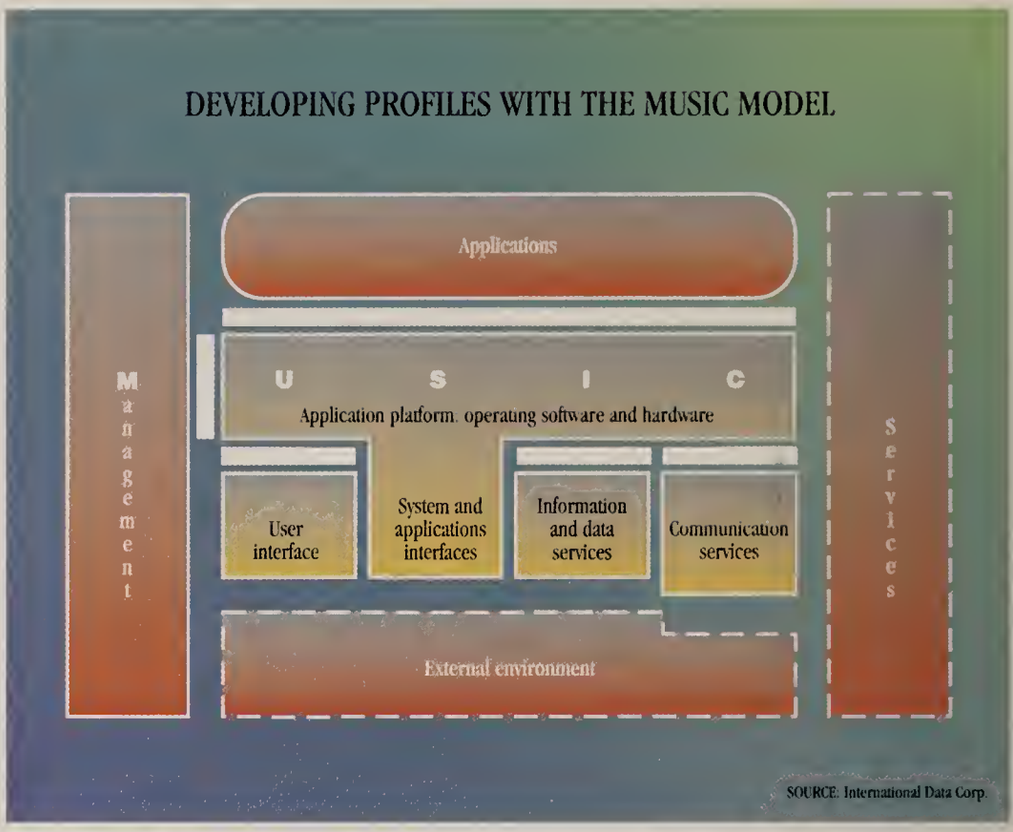


Slightly more than 70% of responding Unix users say they are relying on an open systems strategy based on the use of a standard operating system.

no standards-based solution available, the proprietary solution is better than none.

Standard middleware is the model adopted by users who decide to standardize on a particular component or set of components. Users who wish to acquire standardized middleware, such as a specific vendor's database, should make sure they are not trading off software portability for hardware portability. They could end up locked into a software architecture instead of a certain hardware line.

There are alternatives in the standardized middleware model that can minimize this potential pitfall. IDC believes that standardization at the middleware level represents the most flexible model since it offers more choice and, if implemented in a disciplined way, best avoids proprietary solutions.



Profiles, or internally-developed standard suites, can be developed by employing the MUSIC model: *M*anagement, *U*ser *S*ervice interface for programs, *I*nformation and data formats, and *C*ommunications interfaces.

PROFILING

In order to minimize the chance of being locked into standardized middleware, many users and user standards organizations have adopted a process called profiling. A profile is a suite of standards that specify the functionality needed to support the requirements for a given purpose.

Using profiles can pay off for users in many ways. They can provide a methodology to leverage the use of standards within their own corporations and on a much broader scale. Much work of this type has already been done within corporations. Although not always recognized as profiles, the work often takes the form of corporate guidelines, standards, or specifications. These often are used in the standards requirements sections of RFPs.

Profiles are commonly used to specify either a complete open systems environment or an application-specific environment. The former are called Open Systems Environment (OSE) specifications while the latter are called Application Environment Profiles (AEP).

An AEP identifies the needs of the application area, the standards available that meet those needs, and any gaps that may exist between the needs and the standards. As previously mentioned, there may be non-standardized technology available to fill these gaps. Examples of application areas that could have their own profiles include Computer-Aided-Design (CAD), PC-based software and supercomputing. Although some of the components of the profiles could be similar, or even identical, they are usually quite different.

Given the many standards and technology choices in the middleware area, there are a multitude of ways to organize them within profiles. A model for developing profiles has been developed by the Central Computer and Telecommunications Agency (CCTA) in the United Kingdom. The model is known as Management, User Service interface for programs, Information and data formats, and Communications interfaces (MUSIC). Elements of the MUSIC model are also found in middleware. By utilizing the MUSIC model, users can compare the various approaches taken by open systems and standards organizations. The model can also represent an OSE profile.

THE ROLE OF OPEN SYSTEMS AND STANDARDS ORGANIZATIONS

Differences between the profiles can often be a result of the varying market segment or customer base they are trying to serve. Examples of OSE profiles specified by well known standards organizations include:

- X/Open's Common Application Environment (CAE). X/Open's model is based on its XPG (X/Open Portability Guide). Version 3 of this profile (XPG3) is a widely accepted profile in the industry today.
- The Open Software Foundation (OSF) Application Environment Specification (AES). The AES originally specified many formal standards. Examples of items that have been added to the AES include the Motif Graphical User Interface (GUI), Distributed Computing Environment (DCE) and Distributed Management Environment (DME).
- Unix International's (UI) Atlas framework for Open Systems. UI's Atlas is a framework for procurement similar in concept to IBM's Systems Application Architecture. Atlas specifies Unix System V Release 4, Open Systems Interconnect networking standards, and the popular Motif and Open Look GUIs. It also specifies such distributed computing technolo-

gies as OSF's DCE and Sun Microsystems' Open Network Computing (ONC).

• The National Institute of Standards and Technology's Application Portability Profile (APP). APP is heavily based on formal standards from the Institute for Electrical and Electronic Engineers (IEEE).

Largely as a result of frustration with the extreme slowness of existing standards bodies, many new standards bodies — and proposed standards — are coming into existence. Their proposed standards create even more choices for users, who must decide which standards to specify and adopt.

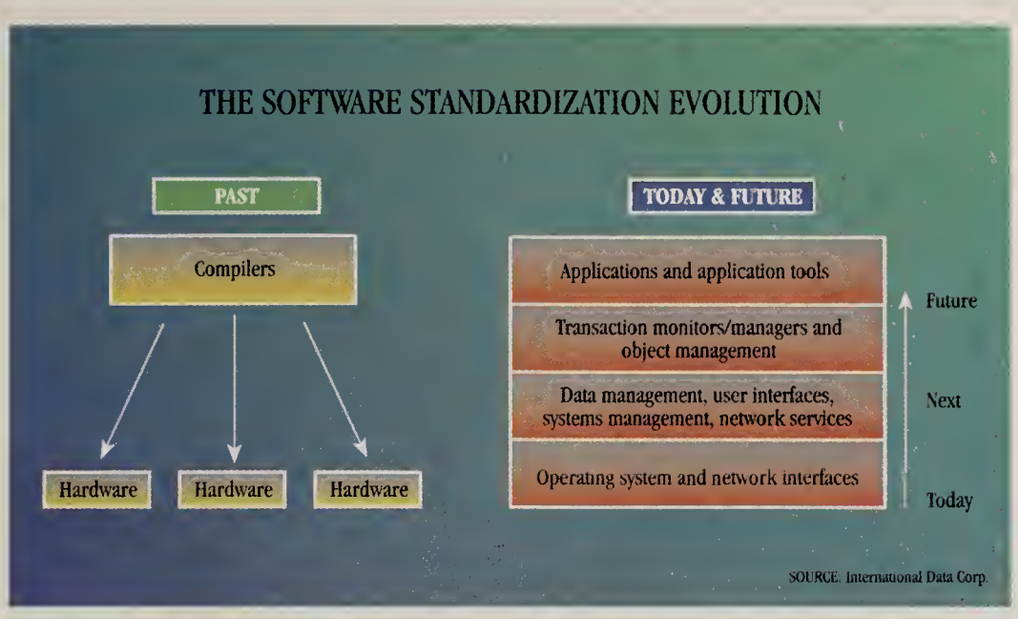
These new breeds of standards organizations come in the forms of consortia and user-driven organizations. Examples of user-driven organizations include the User Alliance for Open Systems and Standards for Open Systems (SOS). Many organizations have representatives in both SOS and the User Alliance for Open Systems.

Both organizations are trying to facilitate the move to cost-effective open systems by articulating user requirements. Their ultimate goal is improved productivity, quality and end-user satisfaction. IDC believes that there is a need for these groups to combine their efforts.

SOS consists of a group of executives from 10 large end-user customers. They are American Airlines, Du Pont, General Motors, Kodak, McDonnell Douglas, Merck, Motorola, 3M, Northrop and Unilever. They have met in an informal, unstructured group on a few occasions to exchange views regarding their common interest in accelerating the commercial availability of open systems based on vendor-neutral standards.

SOS has a somewhat less broad scope than the User Alliance for Open Systems. It is focused on establishing requirements for using profiling. It is looking for quick results by taking advantage of existing processes rather than defining and implementing a new set of processes for information exchange.

COS is an international, non-profit, organization composed of users, vendors, and government agencies. Its mission is to accelerate the introduction of standards-based open systems products and services, and to assist users in achieving practical interoperability. COS is also the umbrella organization for the North American MAP/TOP Users Group, the OSINET Corporation, the ISDN Executive Council and the User Alliance for Open Systems.



Standards fill in complex application development gaps, creating a more integrated set of standard software.

JOINT PROFILING DEVELOPMENT

IDC believes that the concept of profiling can be greatly advanced if users work with each other as well as collaborate with organizations such as the User Alliance for Open Systems and SOS. By working together towards common profiles, many benefits can be realized:

• users will be able to share in the work and eliminate duplication of effort

• users can leverage volume discount potential within corporations

• collectively, groups of users can increase their influence over vendors.

By steering vendors toward certain standards, mass-produced products based on these standards should be relatively inexpensive.

CONCLUSION

After a sometimes arduous 20-year IS evolution to mainframes, minicomputers and desktop computers, companies find themselves on the threshold of a fourth computing wave: the Software and Networking Infrastructure. This fourth wave will attempt to sensibly lace together the many disparate islands of technology created by the first three waves.

The motivating force behind this software and networking effort is the lure of open systems, an environment where computer users will be able to share business and administrative information transparently regardless of their computer types.

The success of open systems will largely depend on the quality and capabilities of the industry's middleware, the software that smooths the troubled waters between applications and computer systems.

The focus on open systems is not merely the brainchild of idle systems analysts or hungry technology vendors. It is being mandated by the needs of the business and the importance of improving the bottom line. Open systems promise less emphasis on technology and more on productivity and customer service. And open systems, implemented properly, can offer more predictable IT investment patterns and resource planning.

The nature of open systems will be determined by individual company needs and business standards. These will provide a framework that can accommodate innovation while still adhering to the fundamentals needed to accomplish company goals.

Open systems, driven by business needs and the desire for investment protection, will become the goal of every company wanting to optimize its information technology resources in the '90s.

IDC White Paper

OPEN SYSTEMS FROM AN END-USER PERSPECTIVE

High tech zeroing in on Butch and Sundance

CONTINUED FROM PAGE 39

suspects or pretenders."

While the bandits are rumored to have died in Bolivia, other legends have them returning to the U.S. under aliases.

As Sadler digitized and scaled the old photographs of Sundance and Butch, superimposing each of their facial measurements over the skulls found in Bolivia, one skull was immediately disqualified as being Butch Cassidy's. The other skull, which may be The Sundance Kid, is now in Dallas being examined by forensic dentists.

Facial comparisons

"Except for identical twins, almost all human faces are unique," Sadler explained. "We use this knowledge, coupled with the average known depths of facial tissue, to make statistical comparisons against a database of some 300 digitized photographs of my students, criminal mug shots and others."

The professor got involved in this project through his friend and colleague, Dr. Clyde Collins Snow, a well-known forensic anthropologist on retainer with the Cook County Medical Examiner's Office in Chicago.

Snow was part of the expedition that spent years in South America following a trail of historical records and clues leading to the mountainside cemetary in Bolivia where Butch and Sundance were allegedly buried in 1907 after dying in a hail of bullets. Results of the investigation are expected to be released sometime this summer.

In 1990, Sadler and Snow used visualization techniques to debunk several photos of individuals purporting to be Billy the Kid, the western gunslinger shot to death in 1887.

Digitized mug shots

While Sadler usually does his visualization work on an older Silicon Graphics, Inc. workstation, the RS/6000 machine was drafted because it was being underused in the department.

Parts of Sadler's software program will eventually be included in a prototype system he is developing for the Chicago Police Department. That personal computer-based system would digitize 800,000 photos and mug shots of criminals and missing children.

One of the first biomedical visualization applications was developed in Sadler's department years ago to simulate facial growth in children so surgeons could more precisely repair severe defects. Then, the National Center for Missing and Exploited Children in Washington, D.C., made use of the application to "age" the faces of babies and toddlers and produce photographs of their likely adolescent appearance. Some 33 children reported missing were subsequently identified and returned to their custodial parents.

Dell outlines server strategy

BY MICHAEL FITZGERALD
CW STAFF

CHICAGO — Like an army that has solidified its positions in the deltas and plains and is now out to take the high ground, Dell Computer Corp. plans to push into the high end of the server market.

J. Michael O'Dell, Dell's vice president of systems development, outlined here at Comdex/Spring '92 a server strategy that will culminate in early 1993 with a multiprocessor that will support up to four Intel Corp. P5 (unofficially called the 586) processors [CW, April 13].

"We're building a PC that can be used in a business-critical environment," O'Dell said in an interview. He added that the entry-level price point would be near $13,000.

Users who were interviewed expressed interest in the news.

Long-term viability

At Nations Bank, where Dell has not made the buying list, Rick Meacham, end-user computing division manager, said, "My major concerns with Dell are the support structure and their staying power. A server would be a sign of their staying power, that they'd be in the market long term."

William Tignanelli, assistant vice president of information systems at the Federal Reserve Bank in Baltimore, where Dell is on the purchase list, agreed: "It would make us more interested in Dell [on the server side]. Our last [Compaq Computer Corp.] SystemPro was much more expensive than what they're talking about."

Tignanelli said vendors such as Compaq would have to match Dell's pricing on servers — if there was no significant difference in capabilities — because a 10% price premium at the server level translates to much more money than it does on the desktop.

Analysts said Dell would face significant hurdles as it moves toward the high-end server market.

"Will a user be willing to pay $13,000 for a Dell, even though it'll have all those wonderful things?" asked Cheryl Currid, head of Currid & Co., a consultancy in Houston. "Would I buy my Nikes at a Kmart and pay top dollar? I don't think I would."

Currid added that Dell has "been successful in transforming their image from a garage door vendor to a full second-tier vendor. But they're playing with a new deck of cards right now. When you're in the PC business, you're dealing with one set of buyers. These high-end servers have a tougher audience: the professional MIS manager, who may scrutinize Dell a lot more than their traditional audience."

Still, Currid said she does not count out Dell. Bruce Stephen, director of PC hardware and pricing at International Data Corp. in Framingham, Mass., said, "I think they have a pretty good shot at it. Dell [has] been able to combine value with the image of technical competence — so they're coming from a good position.

"The hardest thing is that they'll have to go through what Compaq went through with the SystemPro: It's one thing to do boxes, portables and towers, but it's another to be selling, installing and servicing complex networks and mission-critical applications," Stephen said.

O'Dell acknowledged that Dell has hard work ahead of it, but he said it has plans to release products gradually over the course of 1992, to make for a "natural transition" to the superserver realm. Dell has a great deal of the pieces in-house already. "We just need to glue it all together," O'Dell said.

Growth track

Sales growth in the server market during the next two years should track closely to the 11-year CAGR average

U.S. server market

Year	Shipments (in thousands)	Revenue (in billions)
1991	61.5	$2.79
1992	82.4	$3.51
1993	110.6	$4.40

Compound annual growth rate (1986-1996): 24.1%

Source: Market Intelligence Research Corp.
CW Chart: Janell Genovese

UB shows local plan

CONTINUED FROM PAGE 39

UB said it intends to leverage its hub's PlusBus switching architecture, announced last fall, to migrate users to switched local communications to avoid the speed limitations of shared-bandwidth LANs, which have many users vying for a fixed amount of bandwidth. The 300K packet/sec. PlusBus backplane that now resides in UB's Access/One will support Ethernet, Token Ring, FDDI and ATM LANs while users are in transition, Diamond said.

LAN/WAN blend

Another impetus pushing local ATM is the need to aid users in implementing a local-network infrastructure that will ultimately meld with ATM-based wide-area networks coming from public carriers. Using the same technologies on both fronts could someday do away with the LAN and WAN demarcation lines that require gateways and interfaces between them.

Diamond explained that UB's ATM solution will consist of three products that will ship "sometime in 1993": an ATM concentrator module for UB's Access/One hub that will perform ATM cell-switching functions within a workgroup; ATM adapter cards for PCs, Apple Computer, Inc. Macintoshes and Sun Microsystems, Inc. workstations; and an ATM router/gateway card linking the Access/One to an on-premises ATM switch when users want to extend their ATM network out over the wide area.

ATM will appeal sooner to high-end UB customers than lower-end hub vendors' users, said Shirley Hunt, an analyst at Dataquest, Inc. "The majority of companies won't need it. They don't have time to worry about multimedia now." Cabletron Systems, Inc., Chipcom Corp. and Synoptics Communications, Inc. have indicated that they will support ATM in their hubs.

NEW PRODUCTS

Local-area networking hardware

Dataproducts Corp. has created the XP-1 Ethernet print server.

The product works with Dataproducts printers attached to Unix and Digital Equipment Corp. Local-Area Transport (LAT) Ethernet networks. It provides simultaneous support for Transmission Control Protocol/Internet Protocol and LAT. The XP-1 print server offers multiple-host print queuing.

The cost is $1,295.

Dataproducts
6219 De Soto Ave.
Woodland Hills, Calif.
91365
(818) 887-8000

Crescendo Communications, Inc. has introduced a Fiber Distributed Data Interface (FDDI) concentrator and S-bus adapter that allows workstation users to connect over fiber cabling.

The Crescendo 1001 concentrator ($12,995) has eight FDDI ports; two more ports can be added via an optional card. It can be managed by the Crescendo Manager software and supports Simple Network Management Protocol. The S-bus adapter ($2,395) includes a 128K-byte memory buffer to minimize host processor intervention.

Crescendo Communications
710 Lakeway Drive
Sunnyvale, Calif. 94086
(408) 732-5942

Madge Networks, Inc. has announced enhancements to its Smart 16/4 EISA Ringnode adapter card.

The 32-bit card now includes on-board support for unshielded twisted-pair cabling, doubled memory capacity and support for the company's SmartROM feature. SmartROM is optional, reprogrammable read-only memory that allows users to boot the workstation remotely from the network server.

The price is $1,295 for one or $1,195 each in quantities of five.

Madge Networks
Suite C-206
1580 Oakland Road
San Jose, Calif. 95131
(408) 441-1300

Local-area networking software

Tallgrass Technologies Corp. has announced FileSecure Enterpriz, a storage management software product.

The software provides backup and restore capability for data on the server and on individual network nodes. It includes peer-to-peer capabilities and automatically configures itself for the network operating system in use. Other features of FileSecure Enterpriz include Quick File Access, context-sensitive Help and security options.

The price is $795. With a Banyan Systems, Inc. Vines option, FileSecure Enterpriz costs $1,995.

Tallgrass Technologies
11100 West 82nd St.
Lenexa, Kan. 66214
(913) 492-6002

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Enterprise Networking: **ascom Timeplex** *thinks ahead*

IN BRIEF

NEC teams with Cisco

■ Internetworking company **Cisco Systems, Inc.** and **NEC Corp.** said recently that NEC has begun private-labeling and reselling Cisco's complete product line, including multiprotocol routers and terminal servers. The agreement allows NEC to sell Cisco products worldwide, though NEC expects to concentrate on Japan.

■ The NetWare Multiprotocol Router Basic Version 1.0 from **Novell, Inc.** began shipping recently. Novell previously offered routing software only for use in its NetWare file server. The new software, which can be loaded onto any 80386- or I486-based personal computer, frees up the server for other duties. The router handles IPX, OP and AppleTalk protocols over Ethernet, Token Ring, LocalTalk, Arcnet and Fiber Distributed Data Interface.

■ **Cellular Data, Inc.** in Mountain View, Calif., recently received an experimental license for 3-KHz data channels in the commercial radio spectrum allocated for air-to-ground communications. The Federal Communications Commission license allows Cellular Data to construct and operate networks consisting of up to 100 base stations and 1,000 handheld terminal devices within a 30-mile radius of Santa Clara, Calif., Philadelphia and Houston.

■ **Motorola, Inc.'s Mobile Data Division** in Vancouver, B.C., said earlier this month it would add RAM Mobile Data's Mobitex protocol to its family of wireless data modems and terminals. Until now, Motorola's RPM400I and RPM405I internal radio packet modems have supported only the proprietary protocol used in Motorola's own Ardis nationwide wireless data network.

Pioneering integrated management

Tough market to crack for Nynex, Ameritech

BY ELISABETH HORWITT
CW STAFF

While AT&T, MCI Communications Corp. and British Telecommunications PLC are reorienting their network management systems to a more service-oriented approach [CW, April 6], regional holding companies Nynex Corp. and Ameritech Corp. are still groping for a cohesive marketing strategy for their respective platforms.

Nynex's Allink Operations Coordinator and Ameritech's Real Time Manager are both "manager of managers" systems that promise to collect and coordinate network alerts from a wide variety of telecommunications and data networking devices. Both start at around $300,000 and go up to $1 million or more.

"These products as a group have not taken off," said Warren Waldbrand, president of Waldbrand Research & Consulting in New York. As high-priced items that are hard to cost-justify, these systems have been among the first to feel the effects of budget cuts during the recent recession, he added.

Keeping the faith

Nevertheless, neither company is talking about jettisoning this heavy, expensive cargo — at least not yet.

"Last year was not a great one for Allink, but I believe we're not alone," said Daniel Bergin, a spokesman for Nynex Allink Co. Allink "addresses the larger networking clients and is the type of relatively large expenditure you tend to delay." However, Nynex hopes to see that pent-up demand breaks free as the economy recovers, Bergin said. In addition, the company expects to introduce some pricing changes that will position Allink to address customers who want to start their management systems in the $100,000 to $200,000 range, he added.

Allink, Nynex's 2-year-old integrated management system, now has about 12 installations, Bergin said. Its general direction is twofold, he added: It is moving toward tools to allow the user to customize management functions and toward packaged applications that relieve users of the responsibility to develop their own. The applications make use of expert systems to "get beyond fault determination to problem management," Bergin said.

This last move addresses a long-standing customer complaint about the majority of integrated network management systems: It takes six months or more of internal development before these systems do the job. "The major expense of Allink was not in dollars, but in time," said Jeff Speight, a senior vice president at National Westminster Bancorp.

Continued on page 68

Rockwell a 'manager of managers' trailblazer

BY ELISABETH HORWITT
CW STAFF

SEAL BEACH, Calif. — At a time when many companies are finally biting the bullet and choosing an integrated network management platform, Rockwell International Corp. has had its "manager of managers" in place for more than a year.

Last spring, following a year-long evaluation, the manufacturer bought Real Time Manager as a corporatewide network management center. The system gives an overview of the entire network, then zooms in on individual devices, according to Rockwell's manager of network management, Joseph Ballestracci.

Ameritech Corp. resells the product, which was originally developed by Applied Computing Devices, Inc. "The goal was to integrate everything into one management system instead of having everything fragmented" into proprietary products that each manage a different type of network device, Ballestracci said.

The collector

Real Time Manager collects information from IBM's NetView, which manages Rockwell's IBM Systems Network Architecture mainframe network, and from Northern Telecom, Inc.'s DMS 250 switches, which handle voice communications.

"The interface to NetView is really important to us because we run a large SNA network," Ballestracci said.

The system also monitors traffic on the Rockwell Electronic Mail Network, a corporatewide system that includes gateways to a variety of E-mail products at various divisions. These include Digital Equipment Corp.'s All-In-1, IBM's Professional Office System and E-mail on Banyan Systems, Inc.'s Vines local-area networks.

NetView found lacking

Rockwell chose Real Time Manager partly because two years ago few vendors were offering real integrated network management systems with real applications, Ballestracci said. "We did look at NetView as a manager of managers, but at the time, I don't think they had what we needed."

A major advantage of Real Time Manager was the application platforms that were available with the system, Ballestracci said. These include automated trouble ticketing, which tracks problems through to their resolution; call accounting; and network optimization, a package that collects traffic statistics on various network devices and does what-if modeling to determine how to improve traffic flow.

One drawback to moving as quickly as Rockwell did is the possibility of missing out on more advanced features that have become available on subsequent products. "I know a lot of other systems have come on the scene since then, like HP's OpenView," Ballestracci said. One thing that he said he would like to see is more automated building of graphics views of the network, such as maps. Real

Continued on page 68

Multiplatform message service offered by GEIS

BY ELLIS BOOKER
CW STAFF

CHICAGO — GE Information Services earlier this month unveiled BusinessTalk System 2000, a configurable messaging network with which corporate customers can develop electronic bulletin boards, search/retrieval and news clipping services.

GE Information Services, the Rockville, Md., division of General Electric Co. USA, announced the service at Comdex/Spring '92 here. GE officials said the service is intended to capture some of the 14 million users expected to be using public network-based messaging systems by 1995.

In addition to electronic mail, BusinessTalk 2000 offers sophisticated information management and tracking on MS-DOS, Apple Computer, Inc. Macintosh and Microsoft Corp. Windows platforms.

Longtime user PressLink, a Knight-Ridder subsidiary that began marketing on-line digital news photographs in January, makes use of a customized version of the GE service to bill some 475 newspaper customers on a per-photo basis, rather than a traditional and more expensive monthly subscription charge.

Quick-scan capability

The PressLink application also makes use of BusinessTalk's intrinsic file compression/decompression capability to let newspaper editors quickly scan a series of low-resolution images before requesting a high-resolution photo for transmission across the network.

Other standard BusinessTalk 2000 features include the following:

- QuikView, a system that combines bulletin board and hierarchical database features to let users browse through information organized in folders or do full-text searches.
- Scheduled/Automatic Mail and icon-based alerts that inform subscribers of urgent messages.
- System Usage Tracking that monitors use by particular addresses or selected applications.
- Gateways to many host and LAN-based E-mail systems, including those using X.400.

On the DOS platform, BusinessTalk 2000 requires 2M bytes of hard disk space and at least 520K bytes of random-access memory; 1.2M bytes of disk and 600K bytes of RAM or 2M bytes of disk and 4M bytes of RAM are required for the Macintosh and Windows versions, respectively. The software costs $249 per user.

Tough market to crack

CONTINUED FROM PAGE 67

The National Westminster Bank subsidiary has been using Allink for about a year. It took about eight months from "when we first looked at it to when it was operational," he added. The implementation effort involved three Nynex employees and one full-time and one part-time employee from Natwest, Speight said.

Still, Natwest is basically satisfied with the system. Speight praised Allink's expert system and graphical display, "which is helpful for looking at our entire operation. Allink is our intelligent coordinator: The platform that all technicians look at."

Allink also does a good job of collecting alerts from IBM's NetView, as well as the diagnostic systems of Natwest's multiplexers, Speight said.

Ameritech's network management strategy is fragmented among several products, including the following:

- Real Time Manager, a manager of managers developed by Applied Computing Devices, Inc.
- CMS II, a system for keeping track of physical and logical network equipment and configurations, which was originally developed by Westinghouse Communications Software, Inc.
- Multiprotocol Network Manager for Simple Network Management Protocol, designed to manage both SNMP-compatible local-area network and interconnectivity devices, and Token Ring LANs. It also includes some help desk complaint-tracking features.
- Help Desk Solution, announced last month, allows users to call up preprogrammed "cards" that explain how to deal with a particular problem.

Ameritech and Nynex have the advantage of bringing out working systems early. "We looked at systems from AT&T and a couple of others, but we felt that, two years ago, Allink had reached the point where it was more than smoke and mirrors," Speight said.

NOTICE TO NATURALIZED CITIZENS FROM, OR WHO HAVE RESIDED FOR A SIGNIFICANT PERIOD OF TIME IN, THE FOLLOWING COUNTRIES:

Afghanistan, Albania, Angola, East Berlin, Bulgaria, Cambodia (Kampuchea), Cuba, Czechoslovakia, Estonia, Ethiopia, German Democratic Republic (East Germany), Hungarian People's Republic (Hungary), Iran, Iraq, Democratic People's Republic of Korea (North Korea), Laos, Latvia, Libyan Arab Republic, Mongolian People's Republic (Outer Mongolia), Nicaragua, People's Republic of China, Poland, Rumania, Southern Yemen, Syria, Union of Soviet Socialist Republics, Democratic Republic of Vietnam (North Vietnam), South Vietnam, Yugoslavia, the Kurile Islands and South Sakhalin (Karafuto).

YOU MAY HAVE BEEN THE VICTIM OF UNCONSTITUTIONAL DISCRIMINATION BASED ON YOUR NATIONAL ORIGIN

If you are a naturalized United States citizen and your country of origin is included above, or you resided in one of these countries for a significant period of your life, the Department of Defense (DoD) or a DoD contractor may have unlawfully denied you a security clearance or employment, promotion, fellowship or scholarship that required a security clearance, or asked you to apply for a Limited Access Authorization, as a result of DoD's enforcement of a regulation which denied security clearances to newly naturalized United States citizens from these countries or who resided in these countries for a significant period.

The DoD and DoD contractors acted pursuant to a regulation that became effective on January 2, 1987. Although DoD rescinded the regulation on February 12, 1988, it may have been applied after that date. The United States District Court for the District of Columbia has declared the regulation unconstitutional and permanently enjoined the DoD from enforcing it. Huynh v. Cheney, 87-3436 TFH (D.D.C. March 14, 1991).

If you are a naturalized citizen and you believe you have been adversely affected by the enforcement of the regulation on or after January 2, 1987, you may have certain legal rights. For further information, you should contact the United States Department of Justice Office of Special Counsel for Immigration Related Unfair Employment Practices (OSC), by calling 1-800-255-7688 or (202) 653-8121; 1-800-237-2515 or (202) 296-0168 (TDD device for the hearing impaired); or by writing to OSC, P.O. Box 65490, Washington, D.C. 20035-5490. The OSC will provide information and help you process a claim free of charge. The opportunity to pursue these rights is subject to certain time limits, so if you believe the regulation was applied to you, contact the Office of Special Counsel as soon as possible.

Rockwell a trailblazer

CONTINUED FROM PAGE 67

Time Manager "has some nice screens, but you have to do your own thing." The system runs on two DEC 5400 hosts.

LAN monitor

The manufacturer is also waiting for a Simple Network Management Protocol (SNMP) interface that would allow Real Time Manager to manage LAN and router devices that support the de facto standard, Ballestracci said. "We'd like to use SNMP to monitor some of our divisional LANs' off-hours." Rockwell would also like to use SNMP to hook Real Time Manager up to a Sun Microsystems, Inc.-based platform that manages its Network Equipment Technologies, Inc. multiplexers on its backbone.

The system cost Rockwell more than $1 million, Ballestracci said.

Perhaps the biggest advantage to being an integrated management pioneer is that, while other companies are still shopping for systems, Rockwell hopes by year's end to "have the majority of things we want" on its platform, Ballestracci said. "It has some drawbacks, but overall, it is doing the job."

NEW PRODUCTS

Protocol converters

Forest Computer, Inc. has added support for Transmission Control Protocol/Internet Protocol (TCP/IP) to its Connection System networking product.

Connection System users can now interconnect TCP/IP networks with IBM Systems Network Architecture (SNA) and Digital Equipment Corp. DECnet networks. This allows users to interconnect Unix, IBM and DEC equipment while still using the optimal TCP/IP, SNA and DECnet protocols for each environment, according to the company.

Pricing for the Connection System starts at $24,000.

Forest Computer
1749 Hamilton Road
Okemos, Mich. 48864
(517) 349-4700

Gateways, bridges, routers

Fibronics International, Inc. has announced the availability of the K3000 Network Control Unit.

The K3000 connects mainframes to local-area networks. It supports channel speeds of up to 4.5M byte/sec. between IBM standard multiplexer channels and Ethernet or IEEE 802.3 LANs. The product selectively bundles data before sending it to the mainframe, reducing both I/O activity on the network and processor demands on the host system.

Pricing begins at $17,500 for a single channel connection and dual Ethernet connections.

Fibronics International
Communications Way
Independence Park
Hyannis, Mass. 02601
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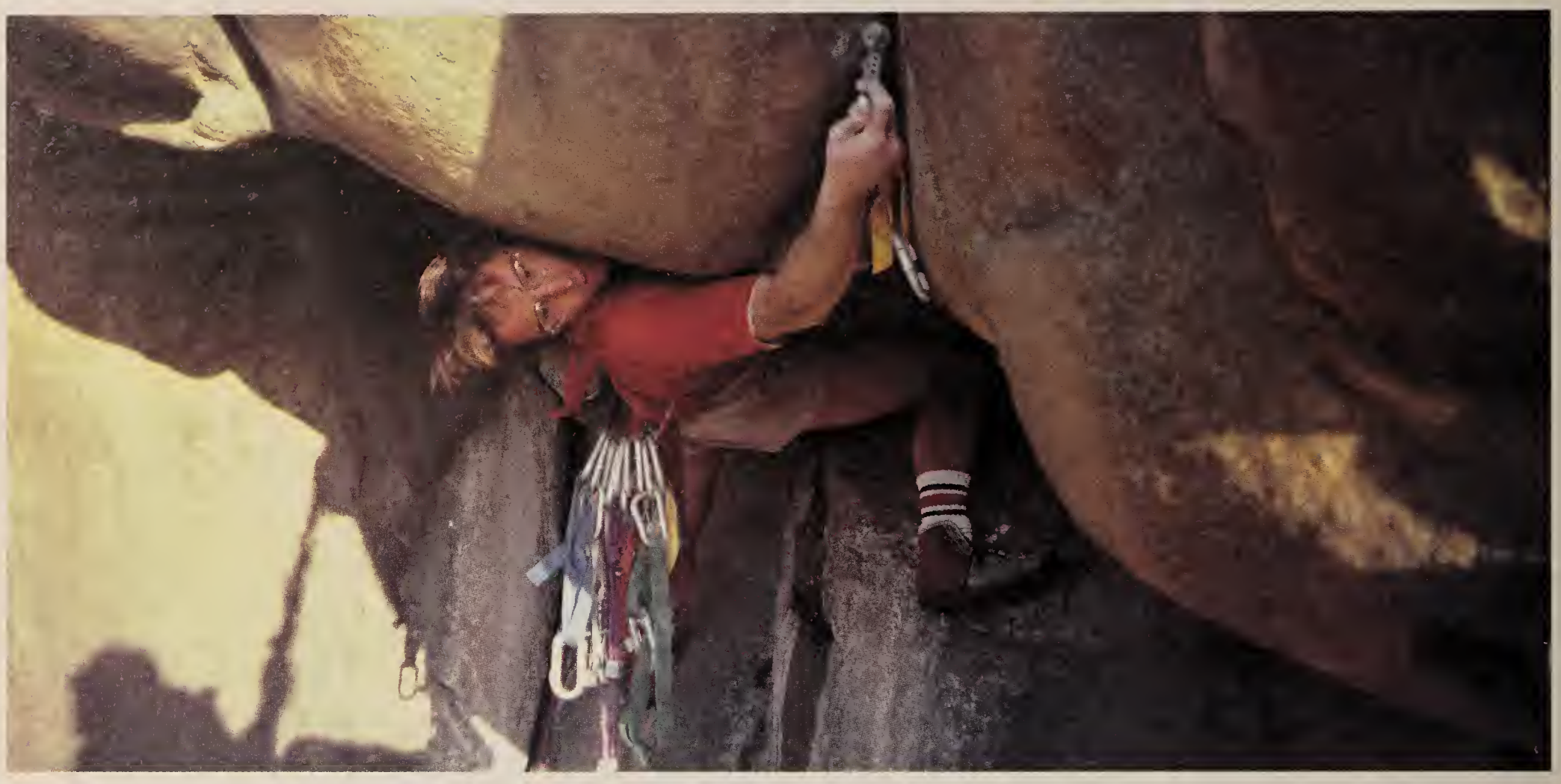
VSAM file sharing: between a rock and a hard place



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Business Partner

Information warehouses: One size does not fit all

Better access to data is the only commonality

ANALYSIS

BY JOHANNA AMBROSIO
CW STAFF

If there ever existed a cookie-cutter approach to information technology, that mold went out the window with the advent of the data warehouse. Instead, early adopters say, the specific implementation depends on the company and the goals it is trying to achieve with its warehouse.

Some users, including Minneapolis-based Grand Metropolitan PLC, consider their data warehouses essentially as front ends to existing production systems. Other companies, such as Owens-Corning Fiberglas Corp. in Toledo, Ohio, view the warehouse as a collection of subject- or application-oriented databases that are kept separate from the operational applications.

Still other organizations, including Cigna Corp. in Hartford, Conn., have a bit of both approaches mixed together.

Enter the desktop

Another issue is one of centralized vs. distributed data. While most early users at least began the warehouse project with a centralized storehouse of information, some are revamping to take advantage of less expensive desktop computers.

Despite their differences, the one thing all the shops have in common is that they allow end users to access, extract and massage information in ways heretofore impossible or impractical. Typically, this end-user access is done on a personal computer, but in some companies it is still done via mainframe terminals.

Although IBM publicized the concept of an information warehouse with its September 1991 announcement of architecture and business partners, some users have been working on their data warehouses for as long as five years. Also, other vendors, including Digital Equipment Corp. and Teradata Corp., have had strategies and products that predate IBM's, analysts said.

Bill Inmon, an officer at Prism Solutions, Inc., a Santa Clara, Calif.-based consultancy, estimated that about 5% of the Fortune 500-class organizations are "actively building" warehouses, another 15% are "looking seriously" at them, and another 10% are "thinking about it." Inmon is a proponent of the approach that advocates keep the informational databases separate from the production applications.

"The operational environment is built for day-to-day needs, not to support informational needs," Inmon said. The latter requires historical data and integrated data, which is not the case with most production systems, he added. Also, allowing end users access to the production applications can grind performance down to unacceptable levels.

Still, cost considerations and time constraints sometimes prohibit what can turn into a multiyear data-modeling exercise for the separate-but-equal approach. Data modeling is re-

Continued on page 74

Decision factors when implementing Information Warehouse

- Will it be a front end into operational systems, a separate subject-oriented database for decision support purposes only or a combination of both?
- If it is to be a front end into operational systems, are those systems revamped or changed?
- Is the data cleaned up at all?
- Is the warehouse centralized or distributed?
- Which end-user query tools are used to tap into the warehouse? How well do they work with the DBMS used as the heart of the warehouse?

Political football

The philosophy of keeping end-user data separate from the rest of the enterprise may be the right thing to do technology-wise, but it sometimes runs into political walls.

To get there, companies must often spend tens of thousands of dollars — or even more — to model data. Not only is the money an issue, but the data modelers themselves are a poorly understood and not always respected department within information systems, the practitioners said.

Sue Herman, supervisor of data administration at Blue Cross/Blue Shield of Michigan in Detroit, said she found that out the hard way. Back in 1989, as a result of a corporatewide IS plan, she and her department began modeling data for use throughout the organization.

A rival group in the decision support area replicated some of what her group was attempting to do. In addition, Herman said, her original stance of discouraging production systems from using the warehouse was a "mistake. It weakened our position. Looking back, I feel we were kind of naive."

She also said her group's inability to prove dollar savings was a drawback. As a result, all warehouse development has stopped.

Then, too, other users speak of political battles when trying to figure out what data is needed and where it should reside. Not all end-user departments want to give up control of information they helped to create.

Another roadblock can be the IS department itself, which, according to one data analyst, "kind of looks at us data types as strange. We really should be the bridge between IS and the users, but we're sometimes not allowed to do our jobs."

One solution is to "find ways to get data administration more visible," said John Chatfield, information warehouse architect at the Salt River Project in Tempe, Ariz. "We have a cross-functional data integration project, and data services is the team leader."

JOHANNA AMBROSIO

Users like DG's MV upgrades but in no rush to buy them

BY KIM S. NASH
CW STAFF

United Hospitals could be using its last Data General Corp. Eclipse minicomputer.

Two data centers, both of which run proprietary DG equipment, service the St. Paul, Minn.-based children's hospital and three other local medical facilities. One data center upgraded from an MV 20000 to a then-top-end MV 40000 in 1990. The other, unable to wait for DG's upgrade to the 40000 that debuted recently, started consolidating two midlevel MVs to a Model 40000 last week.

But the promised hike in processing power does not have Joe Ross, operations supervisor, holding his breath.

"The 40000 we have right now isn't cutting it in terms of response time," Ross said. Managers dealing with the conversion "are worried, seeing our problems," he added.

Going for the gold

But DG is working to save the rest of its U.S. MV installed base, which Computer Intelligence pegs at just under 23,000. DG unveiled its latest proprietary machines recently, along with a storage system that uses redundant arrays of inexpensive disks. According to the company, the MV 60000, which succeeds the former top-level 40000, is a 27 million to 108 million instructions per second box that can be configured with up to four processors.

The MV 35000 — successor to the Model 30000 — extends the family's midrange. It runs up to six CPUs and performs at 9 to 54 Dhrystones. The base price for MV 35000 systems — scheduled for delivery in June — is $177,000. The MV 60000 starts at $750,000 and is due out in August.

Dave Ellenberger, DG vice president for Eclipse marketing, said DG is aiming the new MVs at users who want to consolidate existing smaller systems and at sites running CEO, a proprietary office automation application for the MV.

Users can scale the systems to suit their needs by adding processors, Ellenberger said, adding that all existing MV software will run on the new models.

Springfield Technical Community College in Springfield, Mass., fits the bill on both counts and placed a first-day order for an MV 35000. The school, which has used DG equipment for 14 years, plans to center a revamped technical infrastructure around the new minicomputer.

The college currently runs an MV 10000 but needs beefed-up power and capacity to make its new enrollment management plan work smoothly, according to Douglas Walter Jr., director of administrative computing.

Enhanced demographics

The plan calls for tracking much more enrollment data than the school already does. The system will monitor areas such as demographics, academic standing, family background and special needs in addition to basic data such as courses taken. About 45 users will access the new applications.

"The system we have now just isn't large enough to keep all this data straight," Walter said.

CEO, which provides word processing and executive information systems-type reporting, will help tie the enrollment applications together, he said.

Overall, a half-dozen users interviewed last week expressed relief at continued enhancement to the MV line, but some added they are not likely to upgrade in the near future. A common motivation behind plans to stick with DG — but not with the MV — is the price/performance enticement of replacing proprietary installations with the Unix-based Aviion family.

That mind-set, combined with the poor economy, is to blame for DG's expected loss this quarter, said Chief Executive Officer Ron Skates.

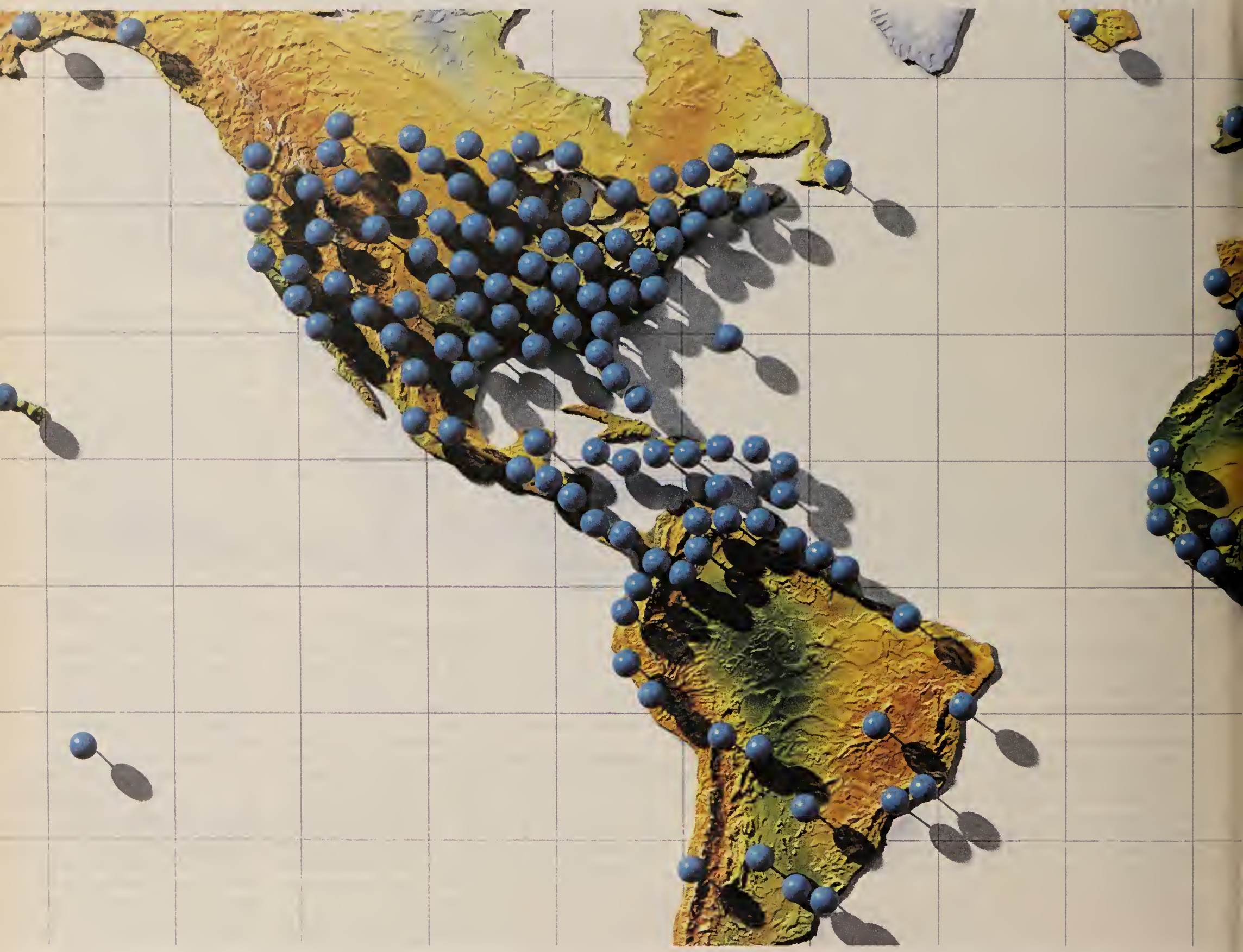
Not hospital's baby

Women and Infants Hospital in Providence, R.I., was typical of the MV users interviewed. The large obstetrics facility runs administrative and hospital information systems on a 2-year-old MV 40000. "I want to see DG enhance the product line, but we won't be one of the first ones to jump simply because [the MV 60000] is out," said Bruce Reirden, vice president of IS.

Reirden said that although "it's nice to know" the new high-end computer is available, he is likely to install another reduced instruction set computing machine rather than expand the existing proprietary setup.

The hospital has started to put together a Unix-based clinical system using an Aviion 6200 and a network of personal computers.

Global computing.



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One size does not fit all

CONTINUED FROM PAGE 71

quired to help figure out the kinds of data that the end users need and to standardize the formats so the data looks alike across hardware and software platforms. Then, too, political pressures come into play.

Nevertheless, some users prefer this approach. Owens-Corning maintains a "distinct line between transaction processing and information delivery systems," said Tim Waldock, project leader of information delivery. The original reasoning behind keeping them separate was because the company did not want to adversely impact performance of the production systems with ad hoc user queries.

The firm's warehouse, which entered the planning stage six years ago, is on a Teradata machine that accesses flat files and databases from Computer Associates International, Inc. and Oracle Corp. End-user tools include Information Builders, Inc.'s Focus fourth-generation language and AICorp.'s Intellect natural language query builder to access information about what products customers are buying.

That architecture is now changing, Waldock said. Where most of the data now resides in the Teradata machine, Owens-Corning is adopting a client/server approach so most of the detailed data will be at the local level. The company will use IBM's DB2 for corporatewide and static information, and it plans to use Hewlett-Packard Co. Unix-based machines to house the local data.

"If Unix were more mature, we would probably move the whole thing onto open systems and skip DB2 entirely," Waldock said. "But Unix isn't quite ready for that yet."

Open access

On the other hand, Grand Metropolitan's food sector has a data warehouse that gives end users access to the actual production systems. "We simplified our architecture and gave people access to that," said John Bjelland, director of planning and technology.

Back in 1985, the company had four different mainframes and 100 minicomputers from 12 vendors. "We had one of everything," Bjelland said. "We spent the time cleaning up data at the source as opposed to separating it out into a distinct warehouse." The firm does, however, maintain some read-only files and has set parameters for what kinds of information end users can access and when they can do so.

For its part, Cigna took a little from both worlds. Although the company has spent some time modeling data, "We've not been as successful in getting our business to fund big data-building projects," said Don Walker, director of technology strategies. "Instead, users want access to the data that is already there."

Cigna uses Information Builders' EDA/SQL to access data in the underwriting and financial areas, among others. Next on the agenda is to build or buy a predictive tool to help users figure out how large a query will be and what it will cost before it actually runs.

There will probably come a time when both operational and informational worlds meld into one, some observers predicted. "The PC tool sets will be able to handle both kinds of requests," Waldock said. "As long as the tools generate SQL, we won't dictate the precise tools for end users. We've already lost that battle. Now we just want to set a general standard."

"There is a way to measure the quality of your technology decisions."

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Imaging takes integration steps

Broad range of products previewed — from high-speed scanners to image, video innovations

BY ELLIS BOOKER
CW STAFF

CHICAGO — Today's $2 billion imaging market is characterized by "operational" systems designed for high-volume, clerical work, such as processing insurance claims.

But this is only the first of two waves, according to Bruce Silver, director of image management systems at BIS Strategic Decisions in Norwell, Mass., and speaker for the imaging systems program at Comdex/Spring '92 held here recently.

Silver said a far broader opportunity for imaging involves its integration with the panoply of existing office automation and production applications currently being used by knowledge workers. "At that point, imaging is less an application by itself and more an enabling technology," Silver said.

Hanging 10

In fact, the new product announcements at Comdex caught both waves, ranging from performance improvements in high-speed scanners to improved software for bringing image and video directly to individual workstations.

■ Imara Research Corp. in Toronto showed an expanded line of OS/2-based imaging products. Among other features, Imara 2.2 for OS/2 allows personal computer applications to be launched from inside Imara's desktop environment and stores images with documents from third-party applications in Imara's customized central filing system. Imara 2.2 for OS/2 will be available in the third quarter.

Imara also introduced a single-user imaging system dubbed Imara Lite. The software, which runs under Microsoft Corp.'s Windows, integrates fax processing, image capabilities and document management. Imara Lite will ship next month for $295.

■ Nikon Electric Imaging in Melville, N.Y., unveiled what it called the world's fastest 12-in. magneto-optical drive. The rewritable drive, capable of a 2.2M bit/sec. data transfer rate, is manufactured by the Tokyo-based Nikon Information Storage Products Division.

■ The Electronic Imaging Division of Toshiba America Information Systems, Inc. announced PageLaser GX400 and GX200 printers will begin shipping late this month and next, respectively. The 17 page/min. GX400 sells for $4,499; the 8 page/min. GX200 is $1,799.

■ Datacap, Inc. in Elmsford, N.Y., announced a forms recognition system featuring unconstrained handprinted character recognition. Paper Keyboard ICR, which requires Microsoft Windows, provides recognition for manually entered letters and numbers on paper forms.

Slated for a midyear delivery, the software will cost $3,995.

■ Leading Edge Products, Inc. in Westboro, Mass., entered the multimedia market at Comdex with four multimedia and two compact disc/read-only memory systems. Pricing for the systems, which include Leading Edge I386SX and I386DX computers, ranges from $1,599 to $3,299.

■ Optibase, Inc. in Canoga Park, Calif., and Truevision, Inc. in Indianapolis announced a combined hardware/software solution for viewing video feeds from a network server.

The companies said they had combined the Truevision Bravado multimedia engine with the soon-to-be-released Optibase image compression and expansion board.

The Optibase boards, available in June, are said to be the first to adhere to the Joint Photographic Experts Group. Pricing has not been determined.

Hitachi claims super to be world's fastest

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Hitachi Ltd. has introduced a family of supercomputers that it claims is the speediest in the world.

The company introduced six Hitac S-3800 and four Hitac S-3600 models, the fastest of which runs at 32 billion floating-point operations per second (GFLOPS) in a four-processor configuration. In a single-processor configuration, it runs at 8 GFLOPS.

The new lineup boosts previous storage, increases data transfer speed and enhances image output. There are also improvements to the HI-OSF/1-MJ Unix and VOS3/AS operating systems that run on the supercomputers, Hitachi said.

Market targets

The company said it is aiming the supercomputers at the manufacturing and service sectors, including machinery, automotive, data service and other businesses. These users are adopting supercomputers to shorten research time and reduce development costs, a Hitachi spokesman said. To date, supercomputers have been used mostly by universities and government research laboratories in Japan.

Another new market segment is financial institutions, which are using supercomputers for economic forecasting. Hitachi said that with these new, broader applications, there is more demand for a wider range of product performance and distributed systems.

Hitachi first joined the supercomputer market in August 1982 with the Hitac S-810 series, which operated at 630 MFLOPS, a world record at the time, the spokesman said.

The S-3800 series uses multiprocessor technology, advanced semiconductors and state-of-the-art packaging to achieve its high processing speeds. Advanced microchips include a 25,000-gate logic chip with a delay time of 60 picoseconds. Four of the six models are air-cooled, and the other two are water-cooled.

With the four S-3600 models, the 10 supercomputers range from entry-level to top-of-the-line models, with a 100-fold performance span from low- to high-end systems.

The company has also introduced several high-density disk drives with a maximum of 2G bytes of main memory and 32G bytes of extended memory. Incorporated into the drives is a high- speed, I/O interface, a high-performance parallel interface.

The OSF/1-MJ is a version of the Open Software Foundation, Inc.'s Unix that Hitachi enhanced with networking and support for a facility to allow parallel handling of Fortran statements. It includes a program development system that enables all processes, from writing to the execution of Fortran programs, to be carried out on a Hitachi 3050 engineering workstation.

The operating system can also run on Hitachi's high-end M-series mainframes.

Leasing fees range from $65,385 to $961,538 per month for the supercomputers and $10,769 for the OSF/1-MJ operating system. The S-3600 processors are due to be shipped this summer and the S-3800 early next year.

NEW PRODUCTS

Applications packages

CODA, Inc. has released the Integrated Procurement System (IPS) for Digital Equipment Corp. VAX systems.

IPS handles purchasing functions including requisition purchasing, purchase-order processing, bids and quotes processing, inventory management, vendor performance analysis and equipment tracking.

Pricing ranges from $26,000 to $225,000.

CODA
Numerica Building
1155 Elm St.
Manchester, N.H. 03101
(603) 647-9600

Productivity Software Resources, Inc. has announced EIS-Track, an executive information system for Unix, IBM Application System/400 and desktop computers.

The graphical software produces customized reports from one or more databases. Pricing ranges from $200 to $2,000 for end users; a developer license costs between $5,000 and $20,000.

Productivity Software Resources
Suite 300, Building 100
1080 Holcomb Bridge Road
Roswell, Ga. 30076
(404) 998-6865

Global Software, Inc. has announced Harmonix Accounts Payable, a client/server software package that runs on mainframes.

The product is completely table driven and integrates easily with Global Software's other financial packages as well as with other companies' financial software, according to Global Software.

The host system handles all security, data integrity and batch processing functions, while personal computer clients perform data entry, validation, query and update functions.

Pricing ranges from $50,000 to $100,000, depending on the number of users and the environment.

Global Software
1009 Spring Forest Road
Raleigh, N.C. 27615
(919) 872-7800

Informix Software, Inc. has announced Wingz Real Time with special introductory pricing.

Wingz Real Time allows users to perform spreadsheet analysis on data being collected in real time.

It extends the HyperScript development language with features such as command execution at specific time intervals and the ability to respond to events generated by external programs. A real-time applications programming interface and C language library come with the product.

The introductory price of $1,600 includes Version 1.1 of the Wingz spreadsheet and Wingz Real Time.

Informix Software
4100 Bohannon Drive
Menlo Park, Calif. 94025
(415) 926-6300

Shakopee Systems, Inc. has released Version 4.1 of its Saturn-CALC spreadsheet package for VMS, Unix and DOS systems.

Saturn-CALC allows users to enter numbers or text; the program will automatically determine the appropriate format for storing the data.

The product includes statistical functions, user-defined functions and the CALC Command Language, a programming language that is similar to Basic, in addition to standard spreadsheet calculation capabilities, according to the company.

Pricing starts at $395 for a personal computer version and ranges up to $30,000 for an unlimited number of users on a Digital Equipment Corp. VAX 9000 system.

Shakopee Systems
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Shakopee, Minn. 55379
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Utilities

BMC Software, Inc. has announced the availability of VSAM Access/CICS.

The product guarantees data integrity during VSAM file-sharing operations by utilizing CICS' recovery feature.

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VSAM Access/CICS can be installed without CICS shutdown or modification of applications. It uses a Common User Access-compliant menuing interface.

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Ease of Install/Upgrade	**8.9**	8.0	8.8	7.1	8.1	7.6
Price/Perform Return	**9.1**	8.3	8.5	7.5	8.1	7.1
FUNCTIONALITY						
Flexibility	**9.1**	8.8	8.6	9.0	8.4	8.6
Interface Capabilities	**8.9**	8.9	8.4	8.7	8.7	8.0
Comprehensiveness	**9.1**	8.8	8.8	8.3	8.7	8.7
User Friendliness	**8.9**	7.7	8.3	7.9	7.5	7.3
OS Compatibility	**9.6**	8.4	8.9	9.1	8.8	9.0
PRODUCT SUPPORT						
Documentation	**9.0**	8.2	8.6	5.7	6.2	7.3
Vendor Training	**8.7**	7.9	8.0	7.2	7.6	8.0
Problem Response Time	**8.8**	7.5	7.2	6.1	6.4	6.7
Quality of Vendor Support	**9.0**	7.8	7.5	6.4	6.9	7.0
Frequency of Releases	**8.5**	7.5	6.7	7.2	7.7	7.2
Response to User Request	**8.8**	7.5	7.8	7.0	7.0	7.3
Overall Satisfaction	**9.3**	8.7	8.5	8.3	8.0	7.9

Compiled from the 1991 Datapro Reports on Software/Computer System Series Software, available for each product listed (Sybase from 1992). The results are those of actual users of the products as surveyed by Datapro.

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Ease of programming	**9.03**	7.09	6.06	6.20	5.90
Ability to manipulate data	**9.19**	7.41	7.44	6.81	5.67
Sorting capabilities	**9.02**	7.44	7.69	6.65	5.78
Provision for software security	**8.56**	6.93	7.28	5.07	5.78
Report writing capabilities	**8.39**	6.72	6.59	5.71	4.11
Ease of use of interface	**8.51**	7.05	6.15	6.10	6.10
Software integration capabilities	**8.34**	7.26	7.24	6.27	6.10
Ease of data retrieval	**9.08**	7.68	7.66	6.61	6.11
Satisfaction with product profitability	**8.26**	7.04	6.22	5.58	5.13
Overall quality of product	**8.94**	7.37	6.69	6.32	5.44
Product Features Average	**8.64**	7.10	6.61	6.14	5.60
SUPPORT FEATURES					
Provision for customer support	**7.74**	5.98	5.76	5.77	5.50
Charges for training time	**6.88**	4.49	4.59	5.64	4.56
Provision for technical support	**7.81**	5.76	5.72	5.87	5.22
Provision for marketing support	**6.89**	5.88	6.09	6.13	3.80
Documentation & product information	**8.74**	6.73	6.56	6.45	5.56
Frequency of updates & revisions	**8.35**	5.88	6.34	5.57	5.00
Support Features Average	**7.73**	5.79	5.84	5.90	4.94
Overall Average	**8.34**	6.66	6.35	6.06	5.38

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CPWADV0420

IN BRIEF

Firm makes its CASE

■ **Computer Systems Advisers, Inc.** in Woodcliff Lake, N.J., has upgraded its computer-aided software engineering (CASE) tool set, POSE Version 4.3. The new release of the multiuser, multiplatform front-end CASE tool is available for $1,195 per single-user tool kit and $2,995 per three-user tool kit.

■ **Seer Technologies**, an application development company in Cary, N.C., formed in 1990 by **IBM** and **First Boston**, said it will integrate the High Productivity Systems (HPS) tool set with AD/Cycle. HPS is a tool set for building software specifically for the financial industry.

■ **Borland International, Inc.** recently introduced a Microsoft Corp. Windows-based report writer for Borland's ObjectVision 2.0 development package. Quik Reports for Windows reportedly can access data in any mix of Borland's dBase, Paradox and Btrieve files. It was designed to use an interactive what-you-see-is-what-you-get report designer and a print engine that provides free runtime capability when used with ObjectVision. It is priced at $195.

Software AG rolls out Unix products

BY GARY H. ANTHES
CW STAFF

RESTON, Va. — Software AG of North America, Inc. has begun shipping Unix versions of its core products — Natural, Adabas and Net-Work — to users looking for ways to ease the migration of IBM mainframe applications to client/server environments.

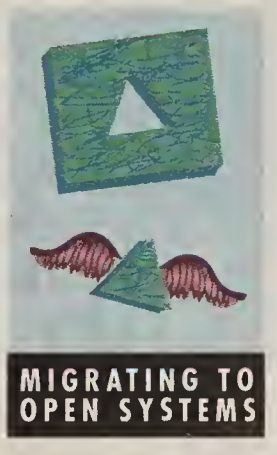
Randy Ebeling, director of data processing at the University of Texas at Austin, has been beta-testing the three products since late last summer, and he has them installed on IBM RISC System/6000s, Hewlett-Packard Co. HP 9000 Series 800s and Sun Microsystems, Inc. SparcStations and Sparcservers. He said he will offload Natural/Adabas applications from his IBM Enterprise System/9000 to postpone the day he has to buy a new mainframe.

Price considerations

"What's motivating me is that the next machine is $25 million," Ebeling said. "My hope is instead of buying a new mainframe every two years as we have for the past 15, we can buy one every five to eight years."

What makes the strategy feasible, Ebeling said, is the ease with which applications using the mainframe versions of the Natural fourth-generation language and the Adabas database management software can now be ported from MVS to Unix. "It's a matter of a few hours, a day maybe. And users will never know the difference," he said.

For Ebeling, the move to client/server is a matter of economics, but for beta user Lou Kleynen, flexibility and availability are the goals. Kleynen, vice president of company information systems at Lechmere, Inc. based in Woburn, Mass., said the retailer wants to move its Natural/Adabas distribution system from an IBM 3090/200E mainframe to IBM RS/6000 platforms in its warehouses.



Ebeling said that during peak sales periods, notably the Christmas season, the distribution application needs to run until midnight, well into the batch-processing window reserved for the mainframe. "We want to give the warehouses total, 100% availability or we'll have trucks waiting outside to unload goods," he said.

Like Ebeling, Kleynen asserted that users would see no difference and that the movement of Natural/Adabas applications from mainframe to RS/6000 would be easy.

Software AG's three new Unix products, which became generally available two weeks ago, are part of the company's distributed computing strategy, called Entire, for offering a consistent, homogeneous environment for development of software to be deployed in networks of heterogeneous systems.

In phase two, to be completed by the end of the year, the company will roll out Unix versions of the Predict data dictionary, the Construct application generator, the Super Natural report writer and device drivers for heterogeneous environments allowing, for example, communication between a Transmission Control Protocol/Internet Protocol local-area network and IBM's Systems Network Architecture.

David MacSwain, vice president of product marketing, said Software AG built its Unix version of Natural on the C version introduced last year for OS/2. Eventually, that C kernel will replace the old IBM and Digital Equipment Corp. assembler versions so that the company will essentially have just one version of the software for each environment.

Ebeling said the key to his school's downsizing strategy was software. "We adopted the [Entire] technology as the blueprint for our future. At some point we're going to choose a box. It will be a horse race; the box that gives us the best price/performance at the time we go into production is the box I will buy."

Ebeling said he was concerned about performance — especially for his high I/O applications — but that it was too early to draw any conclusions about how many Unix boxes it would take to match a unit of mainframe performance.

MacSwain acknowledged that there is still much to learn about Unix and client/server computing. "We're working with our users to answer questions like, 'Is it really better/cheaper/faster?' and, 'Is any Unix environment really industrial-strength in terms of things like restart, reliability and integrity?' "

Powersoft updates tool

BY CHRISTOPHER LINDQUIST
CW STAFF

BURLINGTON, Mass. — Powersoft Corp. has announced PowerBuilder 2.0, the latest version of its development environment for Microsoft Corp.'s Windows 3.0 or 3.1.

The 18-year-old former minicomputer consulting firm, based here, has turned its full attention to the PowerBuilder product, and the update includes several enhancements aimed at increasing robustness and performance.

Among the new features is the object-oriented "Object Easy" architecture that allows developers to use point-and-click programming methods. The environment supports object-oriented techniques without users being required to learn object-oriented programming.

As easy as...

"They have made it literally point-and-click easy for an end user to generate code that has the benefits of object orientation," said Neal Hill, a senior software analyst at Forrester Research, Inc. in Cambridge, Mass.

"So far, the biggest feature that has been useful to me is full object-oriented inheritance," said Mary Panttaja, president of Panttaja Consulting Group in Healdsburg, Calif. "You change ancestors, and it percolates through all the descendants."

PowerBuilder's Smart SQL functions have been expanded, and report generation and object libraries have also been included. PowerBuilder 2.0 also supports Windows 3.1 functions such as drag and drop and Object Linking and Embedding.

The product is capable of operating in a client/server environment using a variety of mainframe-, mini- and personal computer-based relational databases as servers. Supported products include Microsoft's and Sybase, Inc.'s SQL Server, Oracle Corp.'s Oracle, Hewlett-Packard Co.'s AllBase/SQL, XDB Corp.'s XDB, IBM's DB2 via Micro Decisionware, Inc.'s Database Gateway and Gupta Technologies, Inc.'s SQLBase.

PowerBuilder 2.0, slated to be available in June, costs $1,495 for the Standard Edition, which runs with SQLBase and XDB; $3,395 for the Premium Edition of SQL Server, Oracle and AllBase/SQL; and $3,895 for the DB2 edition.

Versant launches C++ tool set

BY JEAN S. BOZMAN
CW STAFF

MENLO PARK, Calif. — With its eye on the existing core of third-party applications, Versant Object Technology, a small vendor of object-oriented databases, announced a C++ tool set to create graphical applications for the Versant database.

Versant hopes that the Interactive C++ Toolset, available for Sun Microsystems, Inc. workstations, will encourage reuse of existing third-party C++ code.

Even though the tool set is based on industry-standard C++, it is not intended for use with other database systems, Versant said. "It's designed to let you exploit Versant if you're an applications programmer," said David Gilmour, executive vice president of marketing at Versant. "Most of our users are already C++ programmers. We don't want to be a C++ compiler company."

Narrow focus

Instead, Versant appears to be addressing users' concerns that its object-oriented database system has too narrow a market to attract many third-party development tools. "The small [object-oriented database management system] firms, like Versant, have an uphill battle, because they're not mainstream and they don't work well with existing databases or applications," explained Aaron Zornes, vice president of Meta Group, Inc.'s Applications Development Group in Stamford, Conn.

Gilmour said the new product was designed to build graphical user interface (GUI)-compliant applications, be compatible with the industry-standard SQL, leverage object-oriented DBMS functions and allow the reuse of third-party C++ class libraries. The Versant Interactive C++ Toolset's Versant Screen GUI module costs $1,800 for a developers' license. Runtime copies are $450. A separate Interactive Object SQL module is priced at $800. A C++ report writer will be available in June.

"They want to break out of the box of CAD development and technical applications," said Paul Cubbage, a senior software analyst at Dataquest, Inc. in San Jose, Calif. "They want to break into the day-to-day applications environment. Their premise is that the world's Cobol programmers are going to transition to C++."

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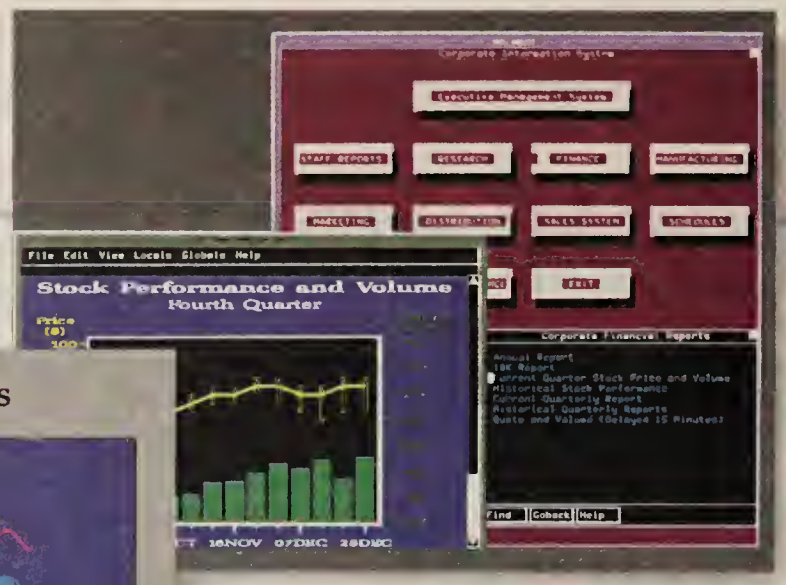

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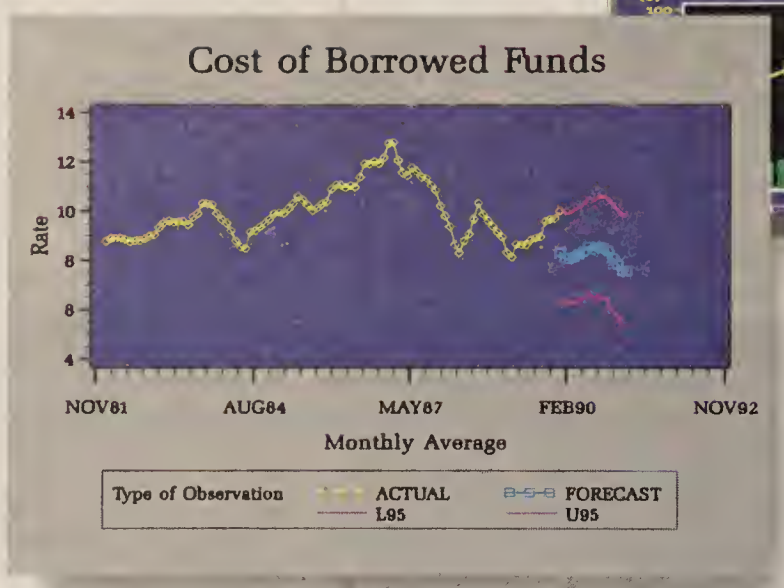

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NEW PRODUCTS

Database management systems

AICorp. has announced its KBMS fourth-generation language application development environment for Sun Microsystems, Inc. workstations.

KBMS for Sun generates SQL code. It allows users to create queries and produce reports and graphs via standard English-language commands, the company said.

Pricing is $8,500 per developer's license and $1,000 per runtime license. Interfaces to Oracle Corp. and Sybase, Inc. databases are included; additional interfaces are available at extra cost.

AICorp
138 Technology Drive
Waltham, Mass. 02254
(617) 891-6500

Development tools

Software Interphase, Inc. has released QuickWindows Advanced for C language.

The product is an interface library written in assembly language. It allows C language programmers to develop IBM Systems Application Architecture-compliant graphics- and text-based interfaces.

The QuickWindows tool kit incorporates more than 180 functions, including windows, pop-up menus, context-sensitive Help systems and a variety of dialog boxes.

It also includes more than 25 DOS system commands, allowing developers to add DOS support to their applications.

DOS functions include multiple file copying and deletion, directory creation and deletion, drive status monitoring and modification of attributes and date.

The product costs $149. Source code costs $349.

Software Interphase
Suite 140
82 Cucumber Hill Road
Foster, R.I. 02825
(401) 397-2340

Innovative Solutions, Inc. has announced Cobol/N400, a tool set for converting Cobol code for IBM System/36 computers to the Application System/400 platform.

The conversion system provides a menuing interface for converting code to Cobol/400. Toll-free support is included, the company said.

Innovative Solutions
1035 Lincoln Road #210
Bettendorf, Iowa 52722
(319) 355-4359

UniPress Software, Inc. has created the UniPress Motif Kits for Sun Microsystems, Inc.'s Scalable Processor Architecture (SPARC) workstations.

The kit allows developers to build Open Software Foundation Motif-compliant applications. It includes Motif 1.1.3 and an X11R4 server optimized for SPARC platforms.

The UniPress Motif Kit costs $750.

UniPress
2025 Lincoln Highway
Edison, N.J. 08817
(908) 287-2100

Guild Products, Inc. has announced Guild Version 2.1 for IBM's OS/2 2.0.

Guild 2.1 is a 32-bit graphical user interface development tool. It allows users to create portable interfaces; interface code is stored separately from application code.

Pricing for the development system is $2,995. The OS/2 2.0 version is scheduled for third-quarter availability, according to the company.

Guild Products
1301 Shoreway Road
Belmont, Calif. 94002
(415) 593-3200

Utilities

Microsoft Corp. has announced Microsoft Test for Windows.

Users can run automated scripts to test new Windows-based applications. Microsoft Test is a graphical tool that runs unattended and logs test results for subsequent analysis.

It includes a version of the Basic language as well as a FastTest utility for users with limited Basic skills.

It can also record and respond to unexpected events such as unrecoverable application errors, the company said.

The product costs $395.

Microsoft
1 Microsoft Way
Redmond, Wash. 98052
(206) 882-8080

Icarus Software has released Icarus SourceSafe, a version control product for DOS-based personal computers.

SourceSafe users can track old versions of source code during application development. It improves storage efficiency by eliminating the need to store every version separately, the company said. SourceSafe also controls programmer access to development projects, preventing developers from overwriting one another's work.

SourceSafe is targeted at companies with a base of code that is ported to many different projects, the firm said.

The product costs $245 for one user, $995 for five users and $3,195 for 20 users.

Icarus Software
1405 Mordecai Drive
Raleigh, N.C. 27604
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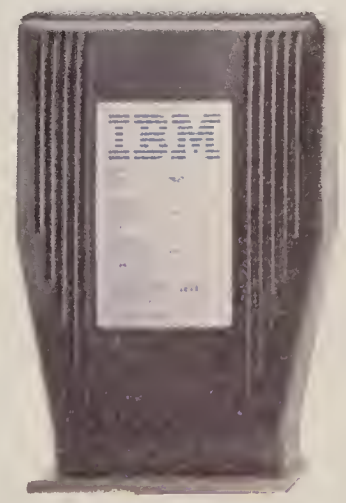

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LAN-capable printers

Printer selection becomes top-rung concern as more people discover the trials and tribulations of sharing printers on a LAN

BY ALICE LAPLANTE

Printers. A mundane subject, right? Sort of like choosing a refrigerator: You worry about capacity and reliability, but otherwise, this is one aspect of your LAN architecture that fades into the background.

Not.

Today, information systems managers say that high-quality, efficient, hassle-free laser printing is a top requirement of their users. At the same time, an increasing number of budget-conscious companies want their users to share these relatively expensive devices via local-area networks. In fact, LAN-attached printers are growing faster than any other printer category (see box below).

But selecting a capable, flexible and *manageable* printer is a much more complicated process than anyone ever imagined. Why? Although the old adage "Any printer can be attached to a LAN" is for the most part true, you still need to be careful in your selection.

Some people can be satisfied with attaching 8 page/min. printers to the LAN via a print or file server. That covers the basics, anyway: engine speed (how many page/min. it prints); processor power (how quickly it can compose pages to be printed); and duty cycle (the volume of pages it can reliably turn out each month).

But many IS managers have found a new set of issues lurking in the LAN-attached world:

- A more efficient way of attaching the printer to the LAN.
- Printer flexibility to meet diverse language emulation, font, output and other requirements.
- A way of maintaining some degree of control over the print jobs being sent from a multitude of users on the network.

A new class of laser printers from the likes of Hewlett-Packard Co., Digital Equipment Corp., QMS, Inc., Dataproducts Corp., Texas Instruments, Inc., Lasermaster Corp., IBM/Lexmark and NewGen Systems Corp. are attempting to solve those issues. And while these printers don't provide the only way to tackle network printing and don't cover every requirement, they are a good running start into the new age of workgroup printing.

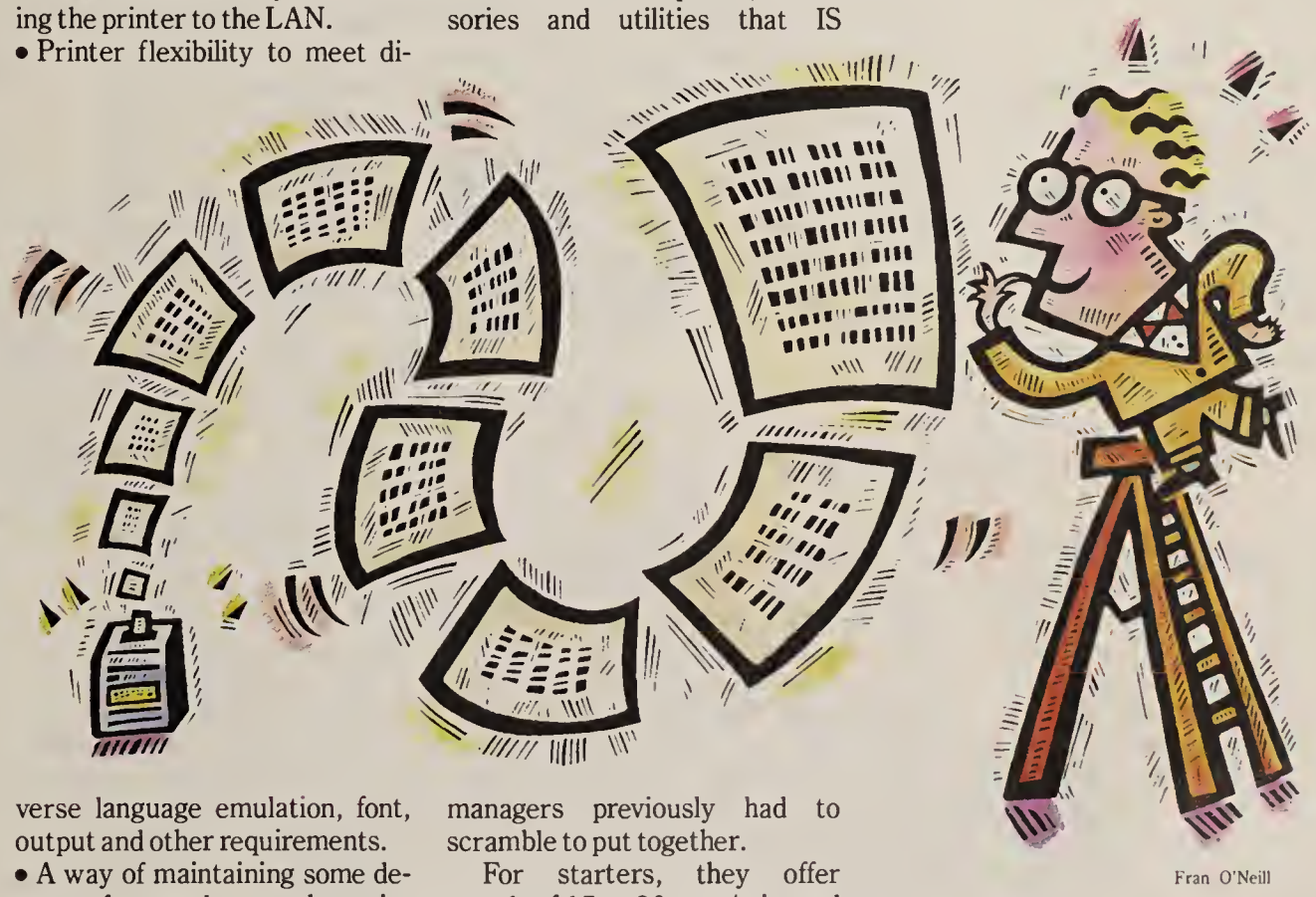
Although pricier than their predecessors — ranging from $4,500 to more than $10,000, compared with $1,000 for a standard 8 page/min. laser printer — these new machines combine a number of options, accessories and utilities that IS managers previously had to scramble to put together.

For starters, they offer speeds of 15 to 30 page/min. and duty cycles of 20,000 or more page/month. In addition, they offer the following:

- Network interface cards, either as an optional attachment or built directly into the printer so that they connect directly to the network backbone.
- Infinitely more sophisticated paper-handling features.
- The ability to simultaneously connect to more than one network or host.
- Some degree of "intelligence," which greatly enhances the limited print-management functionality built into most network operating systems.

Two basic pluses

The advantages of these new network printers come down to convenience and performance.



Fran O'Neill

One of the biggest headaches of LAN printing was simply the fact that someone had to manually refill or switch paper trays. The new network printers offer 500- to 1,000-sheet bins, plus sufficient tray-attachment options.

Some of the top-of-the-line network printers also allow simultaneous input from two or more LANs or from a LAN and a host system. Previously, even if a high-speed printer allowed both Ethernet and Token Ring connections, the user would have had to manually switch between the two.

Just as significantly, the network interface cards can enhance performance because they allow direct attachment to the LAN. The old way — using

Continued on page 82

LaPlante is a free-lance writer based in Palo Alto, Calif.

Growth market

Network-class printers (15-39 page/min.) will be the fastest growing printer market, according to BIS Strategic Decisions in Norwell, Mass.

Worldwide shipments are expected to grow from 95,000 units in 1991 (a 400% increase over 1990) to 400,000 units by year-end 1994, BIS says.

In the U.S., the market for going onto network printers is increasing at a 30% annual rate, compared with a 9% growth rate for the overall U.S. desktop printer market, according to market research firm Computer Intelligence/Infocorp.

INSIDE

Make It Manageable Check out available software for print management. Page 88.

Product Guide Listing of 15 to 19 page/min. printers for $10,000 and less. Page 92.

Buyers' Scorecard HP's LaserJet IIIsi outperforms other printers, users say. Page 95.

LAN printers become top-rung concern

CONTINUED FROM PAGE 81

parallel or serial cables to a file or dedicated print server — can overburden the LAN server. In addition, the printer had to be placed near the file server.

Direct attachment to the LAN frees you from location constraints and makes data throughput more efficient. It offloads significant processing from the file or print server, which no longer needs to actually move data to the printer through the parallel or serial port.

For printers without a direct interface, there are third-party interfaces from Intel Corp. (Netport), Castelle, Inc. (LANpress) and others. Theoretically, these provide the same benefits as hooking a printer directly to a LAN. But experts warn that these external devices are less than optimal.

"Many of these external devices connect to the network through a parallel port, so the performance enhancements of direct connection to the network are lost," says Michael Weiss, president of MWA Consulting, a printer consulting firm in Palo Alto, Calif.

Weigh cost vs. power

Despite all their advantages, experts say this new class of printer is not for everyone, mainly because of cost.

"Many users are perfectly happy to install a number of less powerful printers," Weiss says, adding that most printers on LANs are 8 page/min. HP LaserJets. "The cost of adding another LaserJet III is approximately $1,500, yet the cost of a IIIsi — Hewlett-Packard's network printer — is $4,500."

That's the route taken at Utility Data Corp. in Indianapolis, which installed 38 HP LaserJet Series IIs and IIIs on its 250-node Novell, Inc. NetWare LAN. "Five or six users can share one of these printers, and we save considerably," IS manager Ken Merkel says. Merkel connects his 8 page/min. printers to the LAN via workstations that run Printer Assist print management software from Fresh Technology Group in Gilbert, Ariz.

Most analysts, however, say users will see the advantage to the new printers. According to Bill Gott, program director of printer market research at Computer Intelligence/Infocorp, one of these 15 to 30 page/min. network printers can easily replace four or five 8 page/min. printers that don't have the special workgroup features built-in.

Many experts say the 7 to 14 page/min. printers just don't have what it takes in a workgroup environment.

"That category of printers typically doesn't have the duty cycle capabilities for the network environment, yet it is too high-cost for the personal market," Gott says. "For a small workgroup, I recommend a minimum duty cycle of 25,000 pages per month; for a larger workgroup, 40,000 to 50,000 pages per month," he says. In general, analysts define a small workgroup as fewer than 12 users and a large workgroup as 12 to 30 users, he adds.

The longer duty cycles tend to correspond with how flexible and robust the printer is. Network printers with 30,000 or more page/month duty cycles, for example, are likely to have larger input trays.

Gott says a network printer should have a minimum of two 500-page input bins and a 250-sheet output bin. For larger workgroups, 1,000-page input bins and 500-sheet output bins are desirable.

Also available on the higher speed printers are offset stacking of output sheets and large-paper and duplex-printing capabilities. These features can be found only on 15 to 30 page/min. printers.

Put to the test

Something that can be found only on the high-end network printers is simultaneous multiple interfaces to different hosts or networks. This is especially important for companies with increasingly sophisticated distributed computing environments.

Denise Miano, a senior vice president at consulting firm New England Programming Specialists in Londonderry, N.H., says this is the reason she recommended a Xerox Corp. 4235 35 page/min. laser printer to her client, Reliance National Risk Specialists, Inc. in New York. Reliance needed a printer that would accept simultaneous connections to an IBM Application System/400, an IBM mainframe and the 100-node Ethernet LAN as well as provide automatic emulation switching between Adobe Systems, Inc.'s PostScript and HP's Printer Command Language (PCL). Those requirements justified the nearly $5,000 price tag.

Complex environments such as Miano's are the ones that put any printer to the test. And here is where it becomes all too obvious that printers need to offer better print service features and make it easier to manage print jobs on the network. Essential management features include better queue management, more efficient spooling, enhanced security, status-checking of the device and error recovery.

A good example of where printers need to move is found in the automatic emulation switching found in some higher function printers.

"Not everyone on your network is necessarily printing using the same page description language," says Charles LeCompte, editor of the "Hard Copy Observer," a printer industry newsletter based in Newton, Mass. "You've got PostScript and PCL and DEC and IBM languages, and you want a printer that can handle whatever people can throw at it."

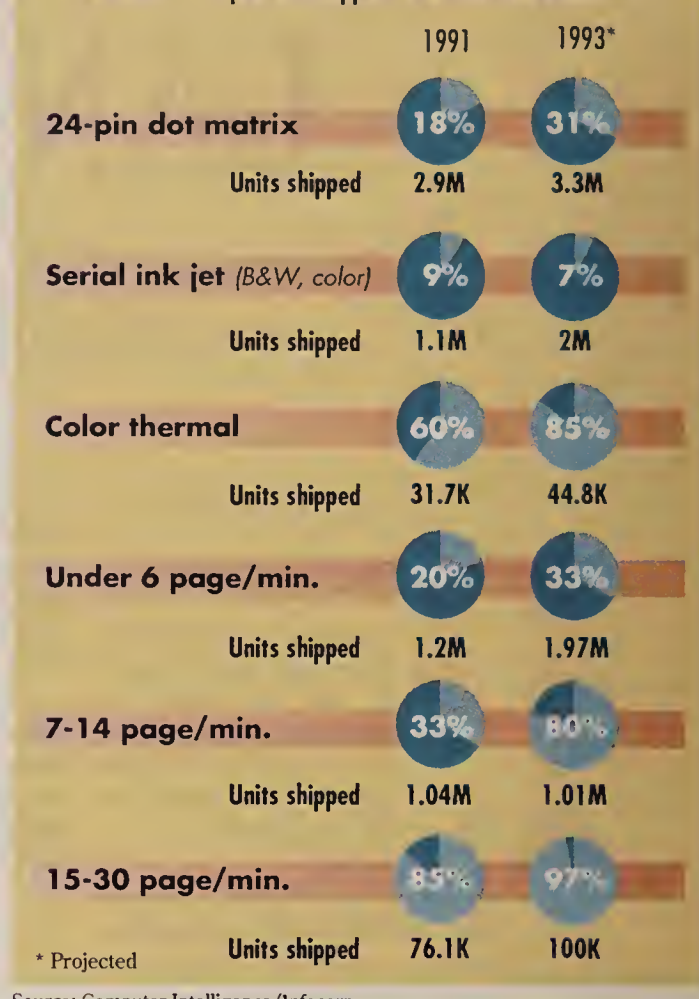
Joe Francis, an IS consultant at Carolina Telephone in Tarboro, N.C., manages a 600-user Banyan Systems, Inc. Vines LAN with 18 servers. The network covers two cities and has about 100 printers of all types from all vendors attached — including both Adobe PostScript and HP PCL printers.

"Users have to know if they are printing PostScript or PCL files and make sure they are sending them to the appropriate printer," Francis says. "We have one HP printer with a PostScript cartridge in our department, and users have to physically go over and make sure the cartridge is installed; otherwise, they either won't get any output at all, or they get garbage."

Instead of buying a printer with emulation switching, you can stoke the print

Big attachment

Most printer categories will see increased LAN attachment, even the under 6 page/min. variety



Source: Computer Intelligence/Infocorp

Try it on for size

Workgroup size plays a large role in deciding whether you buy one expensive printer or many smaller ones. But how does an IS manager decide the right proportion of printers to users?

The answer depends on a variety of factors, most significantly the volume of printed material you produce. In paper-intensive environments such as law offices or governmental agencies, one of the newer class of 15 to 30 page/min. printers might serve only five to 10 employees. In others, such a printer could satisfy an entire 20- or even 30-employee workgroup.

The vendors themselves are beginning to make even further distinctions. The QMS-PS 2000 printer is billed as a "departmental printer" that can serve the needs of an entire corporate department of 30-plus workers, says Bill Gott, program director at Computer Intelligence/Infocorp.

Where the employees are located is another issue. Few workers are willing to walk to a different floor to retrieve their print jobs, so an organization with a widely dispersed population might consider a number of less powerful printers.

IS managers say that as a rule of thumb, they rarely ask more than five or six steady users to share an 8 to 10 page/min. printer. Once that limit is reached, the IS manager can either buy an additional 8 page/min. printer or replace the existing one with a newer and faster product.

ALICE LAPLANTE

To get the right one, baby

The following criteria comprise a checklist of a LAN printer's desired features:

✔ **Engine speed,** usually measured in page/min. The optimal speed for a network printer is generally acknowledged to be 15 page/min. or higher.

✔ **Processor power,** or the speed at which the printer can compose a page to be printed. Some of the more recently introduced laser printers for networks have reduced instruction set computing processors, which increases the speed of composing a page containing graphics or mixed graphics and text.

✔ **Duty cycle,** measured in page/month. Depending on the requirements and size of the workgroup, network printers should be rated anywhere from 20,000 to 50,000 page/month.

✔ **Paper-handling options.** Because shared printing involves massive quantities of paper, it's important to have large-capacity input trays and output bins. Options such as envelope feeders, duplex (two-sided) printing and large-paper handling are also desirable.

✔ **Network connectivity.** LAN-capable printers increasingly have network interface features built-in or available as an option. These allow the printer to be directly connected to an Ethernet or Token Ring LAN, which eliminates the need for a file or print server. For printers without this capability, third-party external devices such as Intel's NetPort can provide similar functionality by offloading some of the heavy processing requirements of the file or print server.

✔ **Support for multiple page description languages.** Most users require both Adobe PostScript and HP PCL support for network printers. In addition, an increasing number are specifically looking for printers that can automatically sense which language a document has been formatted in and automatically switch to the proper mode.

✔ **Print services capabilities.** Most users currently depend on print management functions provided by either their operating system or network operating system for such functions as print queue management, spooling and routine error handling. However, for most users, this isn't enough, so printer vendors are making their printers more "intelligent" by building in more sophisticated management features.

Printer pool

Here is a sampling of what experts say are the most promising entries in the network printer arena:

• **HP LaserJet IIIsi.** 17 page/min. 50,000 page/month. Reduced instruction set computing (RISC) processor. 1M byte of random-access memory. Two 500-sheet input, one 500-sheet output tray. HP PCL language. Simultaneous active interfaces. Optional Adobe PostScript. Optional Token Ring or Ethernet interfaces. Retail price: $5,495.

• **QMS' QMS-PS 1700.** 17 page/min. 50,000 page/month. RISC processor. 8M bytes of RAM. 1,000-sheet input, 500-sheet output bin. Optional Ethernet or Token Ring network interfaces. Up to four simultaneously active interfaces to host or network systems. Supports PostScript and PCL. Automatic emulation switching. Retail price: $7,995.

• **Dataproducts' LZR 1560.** 15 page/min. 30,000 page/month. PCL and PostScript. RISC processor. 4M bytes of RAM. One 250-page input, one 250-page output bin. Two- and three-bin models also available. No built-in network interfaces. Retail price: $5,695.

• **Xerox's 4213 Laser Printing System.** 13 page/min. 45,000 page/month. HP PCL and the Xerox page description language. Optional PostScript emulation. Two 500-sheet input, one 500-sheet output tray. Optional legal-size input tray and 1,500-sheet high-capacity feeder. External box to connect to network. Retail price: $4,795.

• **IBM's LaserPrinter 10L Model 4029-040.** 10 page/min. 20,000 page/month. Resident 16.7-MHz Motorola, Inc. 68020 RISC processor. One 200- and one 500-sheet input, one 250-sheet output tray. Supports PCL. Optional PostScript emulation. Optional network connection to a Token Ring or Ethernet network. External box to connect to network. Retail price: $2,995.

• **TI's MicroLaser XL Turbo.** 16 page/min. 25,000 page/month. One 250-sheet input drawer. Optional 500-sheet input bin and 70-envelope input bins. PCL and PostScript. Automatic emulation switching. RISC processor. 2.5M bytes of RAM. Three concurrent active interfaces to three networks or three hosts. Retail price: $3,649.

• **Alps Electric USA, Inc.'s LSX1600.** 16 page/min. 50,000 page/month. Two 750-page paper bins. 1M byte of RAM. Standard built-in 35-envelope feeder. PCL-compatible. Optional PostScript emulation. No network interface adapters. Retail price: $3,295.

server with software utilities that perform that function, experts say. And that's exactly the debate that's leading us into the next generation of printers: where to put the "intelligence" to manage the complex tasks of printing on a network.

Where to put intelligence

The confusion is whether the management capability should be in the printer, in the network operating system or on the print server. If printer manufacturers built in the management functions, it would unburden the network (and increase the printer price tag).

"Neither Hewlett-Packard nor Adobe can allow this critical software development area to live outside their printer code," Weiss says.

Others, such as Jamie Lewis, vice president at network consulting firm The Burton Group in Salt Lake City, say they believe that printer services located in network operating systems and external utilities will get increasingly more intelligent and sophisticated.

"Companies will come around that specialize in print services, a combination of hardware and software that will optimize printer performance on a LAN," Lewis says (see story page 88).

Currently, a number of third-party vendors are jumping into the market to provide print management products, but none offer a comprehensive solution.

The probable outcome of the debate will probably not be clear-cut. Gott says the market will see an influx of increasingly intelligent printers, while on the low end, "the print server management functions will continue to be done at the file server level or using an external box."

Leaders in intelligent printing are taking different tacks. QMS offers a printer, the PS 1700, that can act as the print server itself, receiving and storing print jobs in the print queue. HP's strategy is to put more intelligence into the printer but make it optional. On the other hand, DEC's DECprint Architecture puts the intelligence at the host or workstation level rather than at the printer.

As the debate rages, IS managers can be sure of one thing: Network printing is at a turning point, and this market won't be mundane for some time to come. •

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Lynn L. Wells
Document Management Representative

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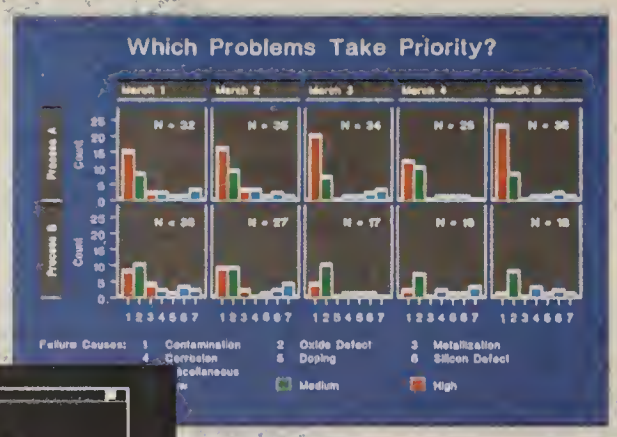

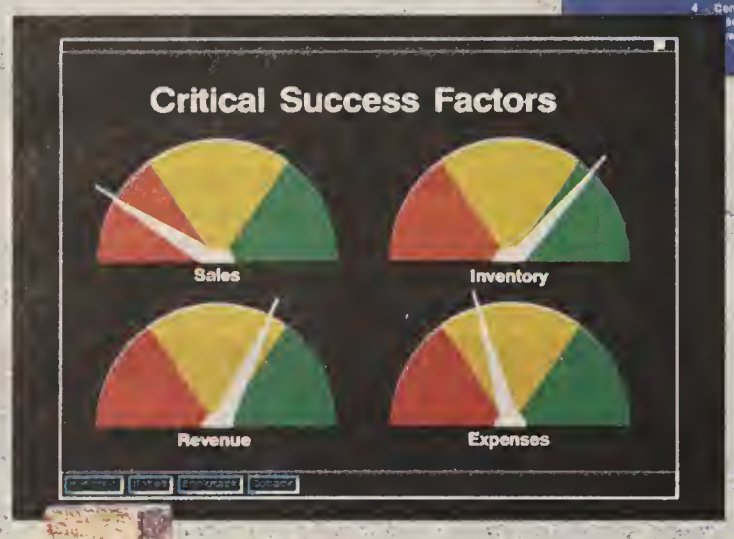

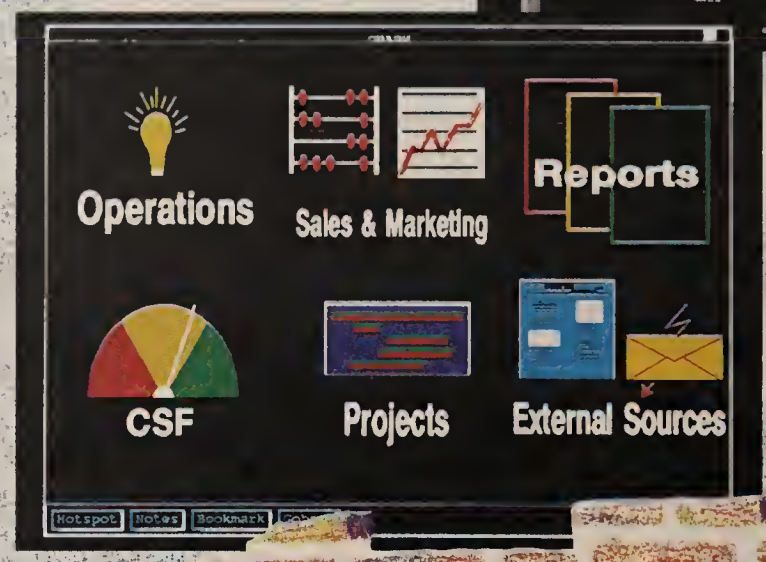

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Help! What's wrong with my printer?

BY LORI YOUNG

It's 4:58 p.m. on Friday. You're cleaning up your desk and are just about ready to leave for the weekend. Then the phone rings.

"Hi Lori, it's Marsha. I don't understand what's wrong, but nothing is printing. Is the LAN down?"

There goes happy hour.

When you get to Marsha's area, you find reams of paper spewing from the printer, each page filled with garbage. You turn off the printer, abort the job from the print queue and check Marsha's workstation, only to find out she's trying to print to an HP LaserJet IIIsi with an Epson print driver from Microsoft's Windows.

You explain to Marsha — as you've explained to many users before her — the reason for her printing problem, and you show her how to select the correct printer for her presentation.

> WOULDN'T IT be nice if the printer could just send users a message saying, "You've selected the wrong print driver"?

This kind of problem is all too typical for most local-area network administrators. As a LAN consultant at Baxter Healthcare, I help many LAN administrators with problems on their networks, and it's fair to say that 50% of the calls they get are printer-related.

The biggest problem with network printing is that it's not transparent to the user. Users should not have to worry about selecting print drivers or fonts, and they definitely shouldn't have to modify code in initialization files when printers are added to the network.

When a user selects "print" from his application menu, the network software should be able to identify the printer that is attached to the default printer port and communicate that information to the application so that the correct driver can be selected automatically. At the very least, wouldn't it be nice if the printer could just send users a message saying, "You've selected the wrong print driver" or "That font isn't available"? Instead, either nothing prints, garbage prints or users get a general error message.

In a network environment running Windows, the biggest headache is adding new printers to the LAN after the initial workstations have been set up because it means you need to add new font definitions to the Windows initialization file.

Windows 3.1 fixes this problem by using what Microsoft calls TrueType fonts. Because these fonts work with any printer — LAN-connected or local, Adobe's PostScript, HP's PCL and others — the user doesn't have to worry if the correct fonts are installed in the WIN.INI file.

Speed is another big issue for network printing, and so is durability if your printers are in heavy use. Our network printers at Baxter are abused regularly by constant printing, constant paper-tray loading and constant toner cartridge replacements.

We've had a good experience, though, with HP LaserJets. My favorite on both counts is the HP LaserJet IIIsi.

But no matter how strict you are about setting up standards and selecting high-quality printers, network printing still has a long way to go before it becomes easy to manage.

If the application software, network operating system and printer talked together to determine the best driver, a lot fewer reams of paper would be wasted. •

Young is a LAN consultant at Baxter Healthcare Corp. in Deerfield, Ill.

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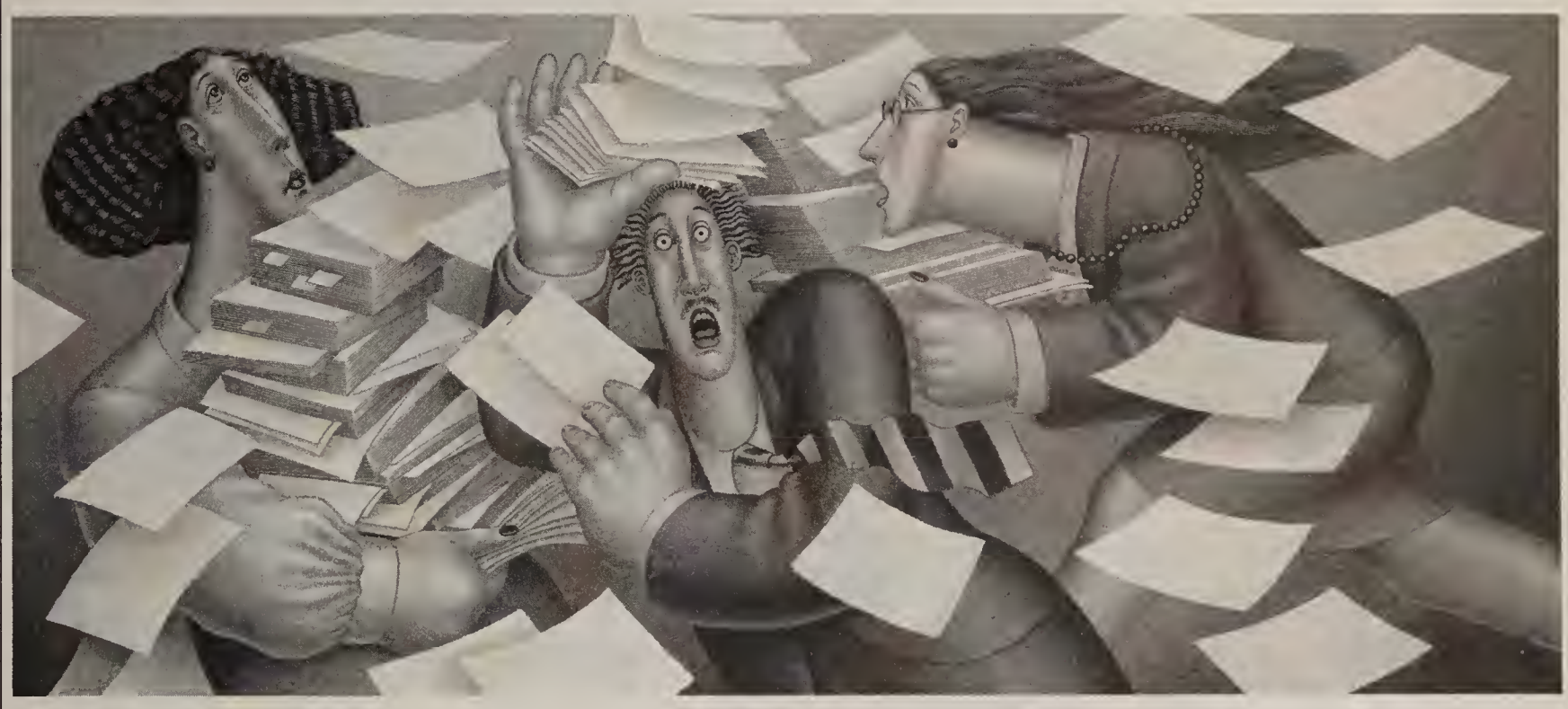

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The mix-and-match school of management

Third-party vendors are filling in where printer and operating systems vendors leave off

BY DOUG ALLINGER

Ask any user: Printing on a network can be complex. Networks need to know which fonts they can use, which print driver to select, which queue to send to, which printer is suitable for the application and what the print job parameters are.

Ask any local-area network administrator: Those complexities translate into more work.

Allinger is an analyst at network consulting firm The Burton Group in Salt Lake City.

So far, however, it's clear that no one — network operating system, printer or third-party software vendor — is planning to provide all the necessary management functionality, which should include (at the very least) the following:

- Error management.
- Printer management.
- Accounting capabilities.
- Resource management.
- Intelligent formatting capabilities.

Network operating system vendors plan to improve their print services; currently, they provide basic services, such as print job redirection, queuing systems and print spoolers.

They also provide the underlying transport protocols that print services need, such as **Novell, Inc.**'s IPX transport and RPrinter protocols.

The printer vendors are just starting to add intelligent capabilities, such as automatic emulation switching. Before they can go much further, though, they've got to get the print services to interact with the printers themselves so that, for instance, the printer can tell the LAN administrator when it needs toner or paper. Before that can happen, work has to be completed on standard protocols (see story page 89).

In the meantime, users should look closely at available third-party solutions to enhance their networks' print services. Available products perform specific print services such as the following:

- Printer performance.
- Page description language support.
- Advanced print services.

Printer performance

Inefficient spooling mechanisms on network operating systems (such as Novell NetWare's Pserver) can severely inhibit performance on network printers.

To remedy that, a handful of vendors offer performance enhancement software. **Digital Products, Inc.**'s LANSprint is a hardware/software product that delivers performance improvements in two areas for NetWare LANs.

First, it uses a more efficient queue-servicing mechanism consisting of a NetWare Loadable Module (NLM) for NetWare 3.0 releases or a Value-Added Process (VAP) for NetWare 2.0 release servers.

LANSprint also improves performance on the network server. It uses a one- and two-port printing coprocessor board to replace a print server's Centronics port with a proprietary LANSprint printer port. The product bypasses the print server's BIOS and uses direct memory access to pass print output to the LANSprint printer port. Performance is said to improve as much as five times over the personal computer's BIOS capabilities.

Language support

Some recently introduced printers can process different page description languages and can even automatically switch from one service to the other.

In many cases, however, it's up to the user to know not only which language his application is using but also which

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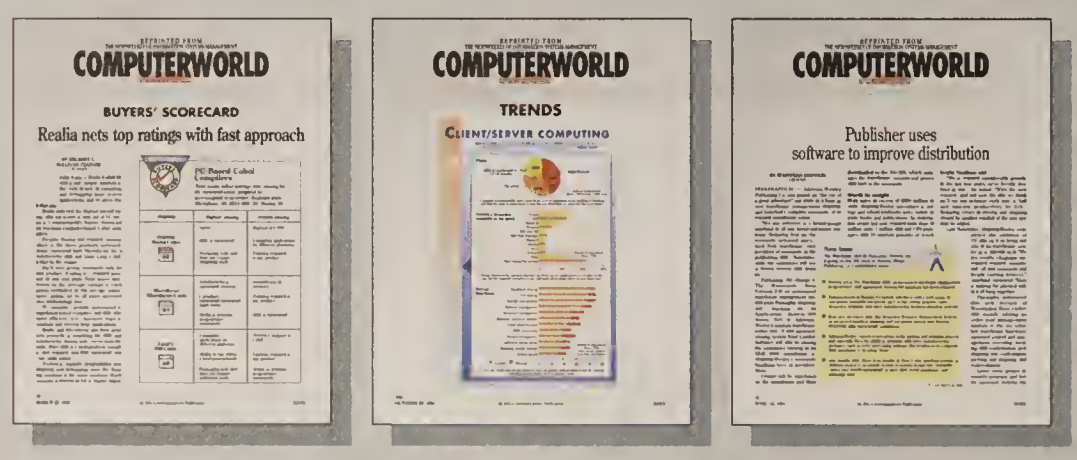

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A sampling of products that perform printer services

Mosaic
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Insight Development Corp.
Emeryville, Calif.
(415) 652-4115

LANScript
PDL formatting software
LANQuest Group
San Jose, Calif.
(408) 283-8900

EtherFlex
Automatic emulation switching add-in board
Extended Systems, Inc.
Boise, Idaho
(408) 322-7575

LANSprint
Performance enhancement hardware/software
Digital Products, Inc.
Waltham, Mass.
(617) 647-1234

Source: The Burton Group

printers on the network are set up to handle those types of jobs. Inevitably, jobs are misdirected, time and paper are wasted, and users are left frustrated.

Products are available that alleviate some of those problems. **Extended Systems, Inc.** offers EtherFlex, an add-in board for **Hewlett-Packard Co.**'s LaserJet II and III series. EtherFlex can automatically sense incoming print jobs as either **Adobe Systems, Inc.**'s PostScript or HP's Printer Command Language (PCL) and automatically switch to the correct format. When it switches printer languages, EtherFlex automatically reloads the appropriate soft fonts to the printer's memory.

Because the product automatically reloads fonts, users do not have to download standard fonts with every job. This reduces network traffic and printing time for users.

LANQuest Group goes one step further with its LANScript PDL Server. This product provides a centralized language formatting service for NetWare clients and gives all networked HP LaserJet printers the ability to service PostScript, PCL 5, HP-GL or TrueImage print jobs, regardless of whether the destination printer supports that PDL natively or not.

The software consists of VAP- or NLM-based print server software and a reduced instruction set computing-based PDL interpreter. It uses the on-board language interpreters to render PDLs into bit-maps, which are then sent to directly connected laser printers through a high-speed video interface.

Advanced print services

The most advanced print services go beyond performance and flexibility enhancements to add previously unavailable intelligence and management capabilities. **Insight Development Corp.**'s Mosaic print server comes closest to meeting those requirements.

Mosaic brings resource accounting, forms management, job management, printer management and font management capabilities to NetWare printing environments, providing network managers with the control and monitoring capabilities necessary to efficiently manage complex print services.

For example, its resource accounting features enable administrators to track printing costs, user activity and printer, paper and font usage. Such accounting features allow users to better calculate resource usage, allowing bill-back for services or more accurate consumables tracking.

Mosaic's job management capabilities enable the print server to ensure that the requirements of a given print job, such as fonts available or type of printer, match the capabilities of the destination printer. When Mosaic detects a mismatch, it sets the job aside and automatically notifies the user of the problem.

While Mosaic provides some of the advanced print services network users and administrators need, it isn't a complete print service solution. There are still a number of architectural components missing.

Ideally, print service software will operate system-independently, support multiple transport protocols, provide queue management and support print service and printer access protocols. In the meantime, plan on grouping products to get the management functions you need. •

Alliance aims to give printers a voice

Most people agree that LAN administrators should be able to manage the printer over the network in the same way they interact with the LCD messages on the printer control panel.

But there's a catch: The standard parallel interface between the printer and the network is unidirectional; commands can be sent to the printer across the network, but there is no way for the printer to send information back.

"When the printer is out of toner, for example, it's essentially a deaf mute. It can't tell you," says Charles LeCompte, editor of the "Hard Copy Observer," a printer industry newsletter in Newton, Mass.

As a result, a number of printer and print service software vendors have formed the Network Printing Alliance. The alliance's mission is twofold: to develop a standard, high-speed, bidirectional parallel port that will enable printers to communicate back to the host through the network and to create an industry-standard printer access protocol that will allow any printer to communicate with any server.

"We are hoping to develop the necessary infrastructure so that applications and printers can communicate directly with one another," says Don Wright, founder of the alliance and manager of attachment products development at Lexington, Ky.-based Lexmark International, Inc..

To address the need for a standard client/service interface, the International Organization for Standardization has drafted the Document Printing Application.

DOUG ALLINGER AND ALICE LAPLANTE

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Advances include LAN-attached color machines

BY MICHAEL WEISS

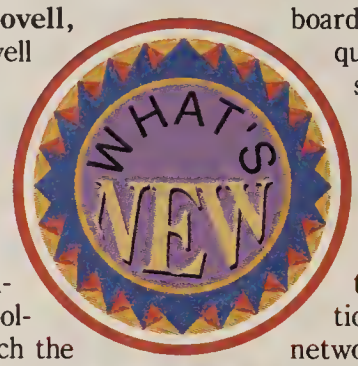
With the new class of 15 to 19 page/min. printers as their impetus, manufacturers are busy adding all kinds of new features for workgroup and departmental printing. This establishes a very attractive trend for users, who can expect the announcements to continue as the market for network printing increases.

▶**Color printers and printer/copiers with network capability.** Until recently, most color printers could only be connected to local-area networks indirectly via a parallel cable connecting them to the server. Virtually all of the color printers that offered direct network connections supported **Apple Computer, Inc.**'s LocalTalk.

Two recent announcements by major providers of color printers are indicative of a trend toward supporting network users, however. On April 6, **Tektronix, Inc.** announced an Ethernet interface that connects its full line of color printers to Transmission Control Protocol/Internet Protocol-based Unix networks. The 4511A interface, which costs about $1,495, is approximately the size of a modem and supports standard Unix spooling and printing functions as well as automatic emulation switching between **Adobe Systems, Inc.**'s PostScript and **Hewlett-Packard Co.**'s HP-GL. The device can also be coupled with Tektronix's PhaserSym VMS printing utility to work on VMS networks. The announcement is a good sign that we will see Ethernet and Token Ring interface options in future releases of color printers.

Weiss is president of MWA Consulting, a Palo Alto, Calif.-based printer consulting firm.

A few weeks before the Tektronix product was launched, **Xerox Corp.** announced a PostScript interpreter that enables its 5775 Digital Color Copier to print color documents from personal computer and Unix workstation LANs. The interface can be connected to Apple Macintosh networks through EtherTalk or LocalTalk and supports **Novell, Inc.** NetWare 3.11 and Novell gateways to Unix networks.



In this configuration, the Xerox 5775 is actually a fully multifunctional printer/copier. As such, it solves one of the technological impediments to general color use in the office: Color copies often do not match the color originals because the two devices may use different technologies to achieve color printing (thermal transfer vs. laser) and different inks. With a single device performing both functions, color matching is achieved.

Canon U.S.A., Inc.'s CLC 500 is a similar product that is available with a choice of network-capable printer controllers.

This type of printer is quite expensive, with the Xerox printer starting at $66,500 and the Canon printer at $50,000. However, as manufacturers increase competition, prices should come down to levels that make them attractive to a greater number of users.

▶**Multifunction printers.** Multifunction printers that incorporate printing, copying, fax and scanning technologies have been talked about for years, but so far, few products have reached the market, and none have enjoyed significant success.

More announcements will be made this year but mostly from vendors that don't incorporate all four technologies. Printers will begin to integrate fax functions before 1993.

Adobe has talked about a fax daughterboard for PostScript printers for quite some time, and the first shipping version is likely to be included in **NEC Technologies, Inc.**'s Silentwriter 95.

Since fax is a workgroup rather than a personal function, the PostScript fax solution is especially attractive for network printers. In addition, printing and fax technologies are natural combinations: Both are quite reliable; neither interferes with the operation of the other; and fax can be added to printers at a reasonable price ($695 for the upcoming NEC product). However, fax products in network printers will need to include sophisticated software that will store, forward, automatically route and perhaps even provide document format interchange.

Users aren't 100% enthusiastic about multifunction printers, however. There are three areas of major concern, especially with copying technology: reliability, cost and the possibility of contention among users sharing the equipment.

▶**New paper-handling capabilities.** A year ago, the HP LaserJet IIIsi set a new standard for paper handling in the 15 to 19 page/min. laser printer class with two 500-page paper trays, duplex printing, a staggered output stacker, a 100-sheet optional envelope feeder and a duty cycle of up to 50,000 pages per month.

In the last few months, paper-handling capabilities have again been increased in this category with the introduction of two printers: **Dataproducts Corp.**'s LZR 1560 and **Toshiba America Information Systems, Inc.**'s PageLaser GX400.

The Dataproducts machine is a PostScript Level 2 printer that produces 11- by 17-in. pages in either 300 or 400 dot/in. speeds. Pricing begins at $5,695 — an extremely aggressive price. The printer is available with one, two or three paper trays, with each tray holding 250 sheets, and also has a multisheet feeder available with a 15-envelope capacity.

While the 30,000 page/month duty cycle is not quite as robust as other printers in this speed class, the real value of the machine is its 11- by 17-in. format at a price that is 45% lower than the next least expensive printer with that capability.

The Toshiba PageLaser GX400 is a new printer with an extremely sophisticated and modular paper-handling design as well as a very fast reduced instruction set computing-based controller, automatic emulation and network I/O capability.

The GX400 allows you to use up to four paper input sources, including two 250-sheet standard paper trays; a multipurpose feeder for envelopes, labels, transparencies or odd-size papers; and a 1,500-sheet high-capacity feeder.

Output is equally modular with a 250-sheet standard design combined with a 1,500-sheet optional stacker. The GX400 also offers optional duplex printing and a monthly duty cycle of up to 50,000 pages. •

Six steps to calculate cost of ownership

BY ANGELE BOYD

Until recently, buyers of low- and mid-speed laser printers didn't pay much attention to cost of ownership; that was reserved for high-speed printers doing very high-volume printing, where cost per page is crucial.

Boyd is manager of printer research at International Data Corp. in Framingham, Mass.

Now, with firms trying to streamline costs and leverage the investments they've made in computers, they're finding it more important to weigh the hidden costs associated with lower speed printers. These printers also continue to replace line printers, which are known for their very low per-page costs, so laser printer vendors are under pressure to bring down their per-page costs.

Cost of ownership — which is defined as the cost per printed page, including consumables, maintenance and the amortized price of the printer — differs significantly, depending on assumptions used in the calculation.

In general, cost per page depends on printer speed: the higher the printer speed, the lower the cost per page.

More importantly, however, is the number of pages you plan on printing per month. If you plan to compare cost of ownership on various printers, you need to determine your monthly page volume.

You can perform a cost-of-ownership comparison by following these six steps:

1 Obtain a list of all consumables associated with each printer you're considering. Consumables include toner, developer, developer station, drum, ozone filter, cleaning unit, charge corona and transfer unit. The cost of paper does not need to be included because it is a constant cost for all printers.

2 Find out the price and number of pages produced by each consumable.

3 Find out how much each vendor charges for maintenance for the coverage you wish. An example is five-day-per-week coverage, eight hours a day. Don't overlook click charges, which are additional maintenance charges specified as a number of cents per page incurred after a certain number of pages have been printed.

4 Determine your actual or estimated number of pages to be printed per month. Use the same volume for all printers being evaluated.

5 Calculate the price of the printer on a per-page basis. To do that, you need to amortize the printer price over five years, or 60 months; that is, divide the printer price by the number of pages you expect to print per month and multiply that by 60 months.

6 Compute all your consumables and maintenance costs on a per-page basis and add them up to reach a total cost per page. For instance, if toner is $100 and lasts 10,000 pages, this is equal to .001 cent per page.

Once you add together numbers five and six, you now have the cost per page to operate each printer at your specified monthly print volume and your chosen maintenance coverage.

The most important thing to note is that you need to look beyond the immediate capital expenditure for the printer to less obvious costs, such as maintenance and consumables. Moreover, all costs are not accurately computed on a per-page basis unless you use monthly page volumes in the calculation. •

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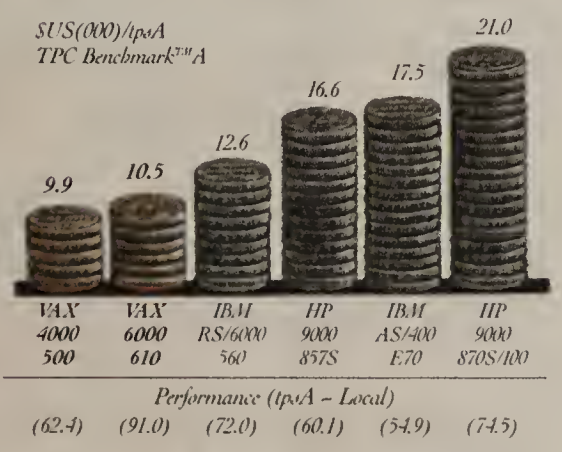

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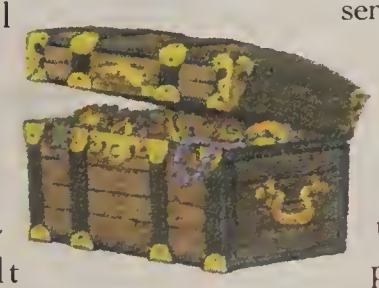

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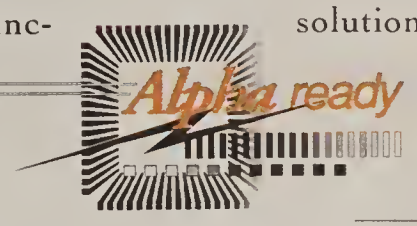

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Laser printers: 15-19 page/min., under 10K

VENDOR	PRODUCT	ENGINE	STANDARD/EXPANDED RAM	PERFORMANCE (PAGE/MIN.)	DUTY CYCLE (PAGE/MONTH)	PRINTER LANGUAGES EMULATED	EMULATION SWITCHING	NO. OF FONTS SUPPORTED	COMPATIBLE FONTS	NO. OF INPUT/OUTPUT TRAYS	INPUT/OUTPUT TRAY CAPACITY	OUTPUT MEDIA SUPPORTED[1]	PRINT MANAGEMENT CAPABILITIES	LAN INTERFACES SUPPORTED	LAN OPERATING SYSTEMS SUPPORTED	DIRECT LAN CONNECTION	PRICE
Advanced Matrix Technology, Inc. (805) 388-5799	TracJet Laser Printer[2]	Pentax	2M/ 8M	16	50,000	PCL 4, IBM ProPrinter	No	5 resident, 2 HP-compatible font cartridge slots	PCL	NA	NA	Letter, legal, labels, envelopes	None	Serial, parallel	NetWare, Vines, LAN Manager	No	$4,695 - $4,995
Advanced Technologies International, Inc. (408) 942-1780	LC-6815 Laser Printer Version S01, S02, S03	Fuji/ Xerox	8M/ 48M	15	25,000	PostScript, PCL, Laserdrive	No	68 resident, downloadable fonts limited by memory	Bitstream outline, PCL	1, 2 or 3/1 bin, 1 stacker	250/250 (bin), 30 (stacker)	Letter, legal, ledger, labels, envelopes, transparencies	Job queueing, job scheduling, feedback on printer status, font management, accounting functions	Ethernet, Token Ring	NetWare, Vines	Yes, via vendor-supplied box ($695 Ethernet, $1,295 Token Ring)	$5,695 - $6,995
Alps Electric USA, Inc. (408) 432-6000	Alps LSX1600	MKE	1M/ 7M	16	50,000	PostScript, PCL	No	24 resident	PCL 4 Type I	3/1	500, 250, 35/500	Letter, legal, labels, envelopes, transparencies	Feedback on printer status	None	None	No	$3,295
American International Devices, Inc. (310) 305-8161	Ai/GBT 6817	Canon	4M/ 16M	17	50,000	PostScript, PCL 5	Yes	14 bit-mapped, 13 scalable, 2 cartridge slots, downloadable fonts limited by memory	HP LaserJet	2/1	500/500	Letter, legal, labels, envelopes, transparencies	Font management, forms merge, form design	Ethernet, Token Ring	NetWare, 3Com 3+Open	Yes, via optional third-party card	$6,990
BGL Technology Corp. (805) 987-7305	LaserLeader Mark 9115 - 3/1, 3/2, 3/3, 4/1, 4/2, 4/3	Fuji/ Xerox	12M/ 36M	15	25,000	PostScript, PCL, LN03 Plus, LaserJet Series II, HP-GL (7475, 7550, 7580, 7585), Tektronics 4010/4014 Versatec, CalComp 906/907, bar code, QMS Magnum code	Yes	35 PostScript, 24 LaserJet, 47 LN03	TrueType, Adobe	1, 2, or 3/2	250/250	Letter, legal, ledger, labels, envelopes, transparencies, A3, A4, A5, B4, B5	Job queueing, feedback on printer status, font management	Ethernet, Token Ring, AppleTalk	NetWare, Vines	Yes, via thick, thin or twisted-pair wiring	$6,595 - $7,995
Bull HN Information Systems, Inc. (508) 294-6000	Bull Model 85	Ricoh	2M/ 6M	15	25,000	PostScript, HP LaserJet +	No	2 cartridge slots, 100+ font cartridges available	Adobe	2/1	250/500	Letter, legal, labels, envelopes, transparencies	Software control	None	NetWare, Vines, LAN Manager	No	$6,950
Dataco DeRex, Inc. (816) 221-1212 (800) 825-1262	Model 1700 Laser Printer	Toshiba	1M/ 9M	17	50,000	PCL 5, IBM PP XL24E	No	43 resident typefaces	Adobe	3/1 (10 optional)	250, 250, 1,500/ 250	Letter, legal, labels, envelopes, transparencies	Feedback on printer status	Ethernet, Token Ring, AppleTalk, Novell	NetWare, LAN Manager	Yes, via vendor-supplied box ($1,295)	$4,495
Dataproducts Corp. (818) 887-8000 (800) 334-3174	LZR 1560	Fuji/ Xerox	4M/ 16M	15	30,000	PostScript Level 2, PCL 4	No	35+ resident	Adobe	1, 2 or 3/2	250/250	Letter, legal, ledger, labels, envelopes, transparencies	Job queueing, feedback on printer status, font management	Ethernet	TCP/IP, LAT	Yes, via vendor-supplied box ($1,295)	$5,695 - $6,995
Data General Corp. (800) 328-2436	Models 6771, 6772, 6773 16 page/min. laser printer	Sharp	0.5M - 1.5M/ 4M	16	25,000	PostScript, HP LaserJet Series II	No	14 - 31 resident, depending on model	Adobe	2/1	250/250	Letter, legal, ledger, labels, envelopes, transparencies	Feedback on printer status, font management	Ethernet, Token Ring, AppleTalk	NetWare, LAN Manager, Unix	No	$3,499 - $7,189
Data Systems Hardware, Inc. (703) 450-1700 (800) 937-3744	Model 2019	Olympus	2M, 5M/ 5.5M	19	100,000	PostScript, PCL	Yes	14 resident	Adobe	2/1	750 per tray/ 1,500	Letter, legal, labels	Job queueing, job scheduling, feedback on printer status, font management, accounting functions	Ethernet, Token Ring, AppleTalk	NetWare, Vines, LAN Manager	Yes, vendor-supplied ($695 - $3,995)	$5,500
	Model 1115	Fuji	4M/ 16M	15	30,000	PostScript, PCL 4	No	35 resident	Adobe, HP Softfonts	1 (2, 3 optional)/2	500 - 700/500	Letter, legal, ledger, labels, transparencies	Job queueing, job scheduling, feedback on printer status, accounting functions	Ethernet, Token Ring, AppleTalk	NetWare, Vines, LAN Manager	Yes, vendor-supplied ($695 - $3,995)	$4,995
Digital Design, Inc. (904) 737-0908	Model 656 Micr Laser Check Printer	Ricoh	1.5M/ 4.5M	15	25,000	HP-compatible	No	15 resident, unlimited downloadable fonts	HP-compatible soft font	2/1	250/500	Letter, legal, checks	Font management, accounting functions	Ethernet, Token Ring	NetWare	No	$8,995
Eastman Kodak Co. (800) 344-0006	Ektaplus 7016 Printer	Kodak	2M/ 2M	16	15,000	PostScript (optional), PCL 4, HP-GL, Epson FX-80, IBM ProPrinter, Diablo 630	No	30 resident bitstream fonts, 1 font card slot, downloadable fonts from host	Adobe	2/1	500/500	Letter, legal, ledger, labels, envelopes, transparencies, three-hole punch, A4	Job queueing, feedback on printer status, supports simultaneous DOS and Macintosh systems	AppleTalk	NA	No	$5,795 (PostScript); $4,495 (non-PostScript)
Electronic Form Systems (214) 250-7000 (800) 367-6373	Formwriter XP 8	Ricoh	None/ none	15	25,000	NEC, Diablo	Yes	Downloadable fonts	EFS (proprietary)	2/1	250/500	Letter, legal, transparencies	Feedback on printer status	Token Ring	NetWare	No	$6,995
Facit, Inc. (603) 647-2700	P5160	Sharp	0.5M/ 4.5M	16	25,000	PostScript, PCL	Optional	14 - 35, depending on options	Adobe	1 (2 optional)/ 1	250/250	Letter, legal, labels, envelopes, transparencies	Job queueing	AppleTalk	TI Net	No	$2,929 - $4,439
Genicom Corp. (703) 949-1000 (800) 443-6426	Model 7170	Toshiba	1M/ 9M	17	50,000	PostScript (optional), PCL 5	Yes	14 bit-map, 13 scalable, line draw for HP, 35 scalable in PostScript, HP-compatible cartridge slot	Adobe	3/2	250, 1,500/ 250, 1,500, mailbox sorter	Letter, legal, labels, envelopes	Font management	Ethernet, Tokeo Ring, AppleTalk, IBM twinax, coax	NetWare, Vines (through server), LAN Manager	No	$4,995
Hewlett-Packard Co. (800) 752-0900	HP LaserJet IIIsi Printer	Canon	1M/ 17M	17	50,000	PostScript, PCL	Yes	14 bit-mapped, 13 scalable (internal), 35 Adobe PostScript, typefaces (optional)	Adobe, TrueType	2/1	500/500	Letter, legal, labels, envelopes	Job queueing, feedback on printer status	Ethernet, Token Ring, AppleTalk	NetWare, LAN Manager	Yes, vendor-supplied ($695 - $895)	$5,495
IBI, a division of DII Technology, Inc. (619) 451-3485	IBI Model 1600C[2]	Pentax	2M/ 8M	16	82,560	PostScript, PCL, Code V	No	86 resident	Adobe, TrueType	NA	NA	Letter, legal, labels, envelopes, transparencies, card stock, pressure-seositive	Feedback on printer status, font management, accounting functions	Serial, parallel, coax, twinax	NP	No	$7,295
Interface Systems, Inc. (313) 769-5900	7817 AFP Laser Printer	Canon	8M/ NP	17	50,000	PCL 4, IPDS 4028, 3812, 3816	Yes	61 resident, unlimited downloadable fonts	IBM, bitstream	2/1	500/500	Letter, legal, labels, envelopes, transparencies	Job queueing, job scheduling, feedback on printer status, font management, accounting functions, additional functions via IPDS	None	None	No	$8,995

[1]Letter = 8½ by 11 in., legal = 8½ by 14 in., ledger = 11 by 17 in., executive = 7¼ by 10½ in., A3 = 11.7 by 16½ in., A4 = 8.3 by 11.7 in., A5 = 5.8 by 8.3 in., B4 = 10.1 by 14.3 in., B5 = 7.2 by 10.1 in. [2]Continuous form feed printer.

All products have a resoulution of 300 dot/in. except Dataproducts' LZR 1560, which has 400 dot/in.; Pentax Technologies' Laserfold, which has 240 dot/in.; and BGL Techology's LaserLedger Mark 9115-4/1, 4/2, 4/3, which have 400 dot/in.

Kyocera Electronics, Inc., (800) 245-8979, responded too late to be included in the chart. Its product is the F3000A, which has a performace of 18 page/min. and is listed at $4,995.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Contact vendor for further product information.

PRODUCT SPOTLIGHT

VENDOR	PRODUCT	ENGINE	STANDARD/EXPANDED RAM	PERFORMANCE (PAGE/MIN.)	DUTY CYCLE (PAGE/MONTH)	PRINTER LANGUAGES EMULATED	EMULATION SWITCHING	NO. OF FONTS SUPPORTED	COMPATIBLE FONTS	NO. OF INPUT/OUTPUT TRAYS	INPUT/OUTPUT TRAY CAPACITY	OUTPUT MEDIA SUPPORTED[1]	PRINT MANAGEMENT CAPABILITIES	LAN INTERFACES SUPPORTED	LAN OPERATING SYSTEMS SUPPORTED	DIRECT LAN CONNECTION	PRICE
Lexi Computer Systems Corp. (508) 521-1118 (800) 222-5394	Intermate AFP III Si C, Intermate AFP III Si T	Canon	5M/ 16M	17	50,000	PostScript, PCL 5, IPDS, AFPDS	Yes	14 PCL, unlimited IPDS/AFP	Adobe, IBM AFP, IBM 3812, 3816, 4028	2/2	500/500	Letter, legal, labels, envelopes, transparencies, A4, executive	Feedback on printer status, IPDS resource checking	Ethernet, Token Ring	NetWare	No	$9,850
	Intermate 3270 III Si	Canon	1M/ 16M	17	50,000	PostScript, PCL 5, IBM SCS (LU1), 3270 (LU3)	Yes	14 PCL, IBM 3812, 3287, 3268, 4214	Adobe, IBM 3812, 3287, 3268, 4214	2/2	500/500	Letter, legal, labels, envelopes, transparencies, A4, executive	Feedback on printer status, all 3270 resource checking	Ethernet, Token Ring	NetWare	No	$6,895
	Intermate 5250 III Si	Canon	1M/ 16M	17	50,000	PostScript, PCL 5, 5250 Twinax protocol (non-IPDS)	Yes	14 PCL/all IBM 3812, 5219 fonts on Twinax	Adobe, IBM 3812, 5219	2/2	500/500	Letter, legal, labels, envelopes, transparencies, A4, executive	Feedback on printer status, all 5250 resource checking	Ethernet, Token Ring	NetWare	No	$6,895
NCR Corp. (513) 445-5000	6436-0601	Ricoh	2M/ 4M	15	25,000	PostScript, HP JII, IBM ProPrinter XL, Epson FX-80/286e, Diablo 830, HP 7475 A Plotter line printer	No	35	Adobe	2/1	250/500	Letter, legal, labels, transparencies	NA	NA	NA	No	$6,795
Octus, Inc. (619) 452-9400	1510 Plus	Ricoh	1.5M/ 4.5M	15	25,000	PCL, express	Yes	27	HP-compatible bit-mapped	2/1	200/250	Letter, legal, labels, envelopes	NP	Ethernet	NetWare	Yes, via third party ($700)	$5,995
Output Technology Corp. (509) 536-0468 (800) 468-8788	LaserMatrix 1000, Models 5 and 6[2]	Asahi Optical	2M/ 10M	16	25,000 - 50,000	PostScript, PCL 5	Yes	19 bit-map fonts, 43 scalable typefaces	TrueType, Adobe, Intellifont	NA	NA	Letter, legal, labels	Feedback on printer status	Ethernet, Token Ring, AppleTalk	NetWare	Yes, via optional third-party card ($695)	$5,495 - $5,995
Pentax Technologies Corp. (303) 460-1600	Laserfold 240 printer[2]	Pentax	32K/ None	16	NP	Epson FX-80 Text	No	1	None	NA	NA	Letter, labels, variable media from 4 by 9 in. wide, depending on software control	Feedback on printer status	All via serial or parallel port on print or file server	All via serial or parallel port on print or file server	No	$3,495
Personal Computer Products, Inc. (619) 485-8411	LI 3020 series	Ricoh	512K/ 5M	15	25,000	PostScript (optional), PCL 4	No	35 PostScript, 31 resident	Adobe	2/1	250/250	Letter, legal, labels, transparencies	Feedback on printer status, font management, simultaneously active ports	None	None	No	$5,995 - $6,795
Printer Systems Corp. (301) 258-5060	Network Intelliprint XL	TI	512K/ 10.5M	16	25,000	PostScript, PCL	Yes	35 PostScript	Adobe, TrueType, HP	2/1	250, 500/ 250	Letter, legal, labels, envelopes, transparencies	Job queueing, job scheduling, feedback on printer status, font management, accounting functions	Ethernet	NetWare	Yes, via optional integrated card	$2,995 - $4,245
Printronix, Inc. (714) 863-1900, (800) 826-3874	L1016[2]	Pentax	8M/ 21M	16	NP	PostScript, Printronix line printer, Printronix graphics language, Magnum code, IBM ProPrinters	No	All Agfa Intellifonts	Adobe, Agfa	NA	NA	Anything 4 to 9 in. wide, labels, tags	None	None	None	No	$6,995
QMS, Inc. (205) 633-4300	QMS-PS 1700	Canon	8M/ 32M	17	50,000	PostScript, PCL, HP-GL, CCITT Group 4	Yes	45 PostScript resident, all standard bit-mapped PCL	Adobe	2/2	500/500, 100	Letter, legal, labels, envelopes, transparencies, A4, executive	Job queueing, font management, simultaneous interface operation	Ethernet, Token Ring, AppleTalk	NetWare, DECnet, EtherTalk, TCP/IP	Yes, vendor-supplied interface ($995 - $1,845)	$7,995
Rosetta Technologies Corp. (813) 623-6205 (800) 937-4224	RT 3216 Continuous Laser Printer[2]	Pentax	2M/84	16	50,000	PCL	No	8 resident	HP Series II	NA	NA	Letter, legal, labels	Feedback on printer status	Ethernet, Token Ring, AppleTalk	NetWare, Vines, LAN Manager	Yes, via vendor-supplied box ($695 Ethernet, $995 Token Ring)	$4,995
Sharp Electronics Corp. (201) 529-9593	JX 9700 Laser Printer	Sharp	1M/ 5M	16	15,000	PCL 4, IBM ProPrinter, IBM Graphic Printer, Epson FX-80, Diablo 630	No	14 resident	PCL 4 bit-mapped	3/2	780/250, 75	Letter, legal, labels, envelopes, transparencies	None	Ethernet, Token Ring, AppleTalk	NetWare, Vines, LAN Manager	No	$2,295
Synergystex International, Inc. (216) 225-3112	CF1000[2]	Pentax	2M/ 8M	16	20,000	PCL 4	No	2 resident, 2 HP-compatible LJII cartridge slots	LaserJet Series II compatible	NA	NA	Any media 4 to 9½ in. wide	None	None	None	No	$4,995
Talaris Systems, Inc. (619) 587-0787	1590-T Printstation	Ricoh	6M/ 18M	15	25,000	PostScript, PCL, LN03 Plus, HP-GL	Yes	80 resident, hundreds optional	Bitstream, Agfa/Compugraphics, TEX, ASCII	2/1	250/450	Letter, legal, labels, transparencies	Job queueing, feedback on printer status, font management, accounting functions	Ethernet, EtherTalk	NetWare, TCP/IP, DECnet	Yes, via vendor-supplied box ($695 - $1,590)	$7,990
Texas Instruments, Inc. (512) 250-7401 (800) 527-3500	MicroLaser XL Turbo	Sharp	2.5M/ 10.5M	16	10,000	PostScript, PCL	Yes	35 resident	Adobe	1/2	250/250, 50	Letter, legal, labels, envelopes, transparencies, invoices	Receive buffer	Ethernet	LAN Manager via third-party port	No	$3,649
	MicroLaser XL PS35	Sharp	1.5M/ 4.5M	16	10,000	PostScript, PCL	No	35 resident	Adobe	1/2	250/250, 50	Letter, legal, labels, envelopes, transparencies, invoices	Receive buffer	Ethernet	LAN Manager via third-party port	No	$3,149
	MicroLaser XL PS17	Sharp	1.5M/ 4.5M	16	10,000	PostScript, PCL	No	17 resident	Adobe	1/2	250/250, 50	Letter, legal, labels, envelopes, transparencies, invoices	Receive buffer	Ethernet	LAN Manager via third-party port	No	$2,799
	MicroLaser XL	Sharp	0.5M/ 4.5M	16	10,000	PostScript, PCL	No	35 PostScript	Adobe	1/2	250/250, 50	Letter, legal, labels, envelopes, transparencies, invoices	Receive buffer	Ethernet	LAN Manager via third-party port	No	$2,399
Toshiba America Information Systems, Inc. (714) 583-3000	Toshiba PageLaser GX400	Toshiba	1M/ 9M	17	50,000	PostScript, PCL, IBM ProPrinter XL 24e	Yes	27 resident, all LaserJet IIIsi-compatible fonts, HP LaserJet II/III-compatible cartridge slots	Adobe	2/2	250/350 100	Letter, legal, labels, envelopes, transparencies	Job queueing, job scheduling, feedback on printer status	Ethernet, Token Ring, AppleTalk	NetWare	Yes, vendor-supplied ($699 - $899)	$4,499, $999 PostScript-compatible option with AppleTalk
Unisys Corp. (313) 454-3333 (800) 448-1424 Ext. 161	AP 9215-1 Laser Printer	Ricoh	1.5M/ None	15	25,000	PCL 4, IBM ProPrinter, Epson FX-80, Diablo 630	Yes	15 resident, unlimited downloadable fonts	HP	2/1	250/500	Letter, legal, labels, transparencies	Feed back on printer status, font management	NA	NetWare, LAN Manager, CTOS, Unix	No	$5,995
Wang Laboratories, Inc. (800) 835-9264	LDP17-DSK	Canon	4M/ 17M	17	50,000	PostScript (optional), PCL	Yes	14 resident	Adobe, PCL 5 scalable	2/1	500/200	Letter, legal, labels, envelopes, transparencies	None	Ethernet, Token Ring	NetWare	Yes, via third-party card ($695 - $895)	$5,495
XPoint Corp. (404) 446-2764	XP1500	Ricoh	1M/ 6M	15	25,000	PCL	No	40 resident	PCL bit-maps	2/1	250/500	Letter, legal, labels, transparencies	Job queueing	NA	NA	NP	$6,495

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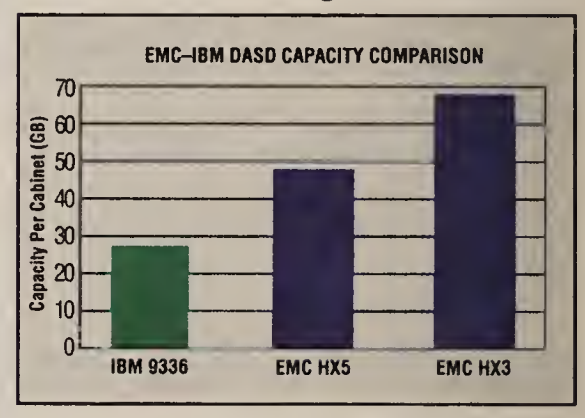

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BUYERS' SCORECARD

HP's IIIsi jets to top of printer market

BY DEREK SLATER
CW STAFF

Hewlett-Packard Co.'s users show why the LaserJet IIIsi dominates its market: The printer received far superior marks to its competitors in user satisfaction, according to *Computerworld*'s Buyers' Scorecard survey on local-area-network-capable laser printers.

HP's entry earned an overall score of 83 among midrange (15 to 20 page/min.) laser printers that can be used on LANs. Texas Instruments, Inc.'s MicroLaser XL placed second with a rating of 78, while QMS, Inc.'s QMS-PS 2000 scored a 73.

Users gave 1-to-10 ratings based on their satisfaction with their printers in 15 specific categories. They also rated the relative importance of each category (see methodology next page for a detailed description of how the total score was derived).

Total possible score	100
Mean score	78

The critical performance measure for LAN-based printers is reliability, according to user importance ratings. The LaserJet IIIsi comfortably earned the top mark in that area (9.4, compared to 8.3 for the second-place finisher).

The LaserJet IIIsi accounted for close to 50% of the printers shipped in 1991, according to Computer Intelligence/Infocorp (see chart next page). Users gave HP's printer the highest rating in 12 of the 15 categories. Its highest scores came in the areas of reliability (9.4) and quality of printing (9.2), which users tabbed as the two most critical areas of printer performance. Other high-scoring areas for the LaserJet IIIsi were ability to print graphics (8.9), expandability of random-access memory (8.6) and value for the dollar (8.5).

The lowest score for the LaserJet IIIsi was in support for multiple page-description languages (6.9) — the only area where the product finished third. Responsiveness of vendor service (7.2) and quality of vendor support (7.3) were the LaserJet IIIsi's next lowest scores; however, it outscored its competitors in both of these categories.

The MicroLaser XL topped the three categories not won by the LaserJet IIIsi: ease of use (8.5), support for networking protocols (7.5) and support for multiple page description languages (7.7). Its highest scores came in quality of printing (8.7) and ability to print graphics (8.9), while the MicroLaser XL also fared well in the important reliability category (8.3).

Particularly low ratings in responsiveness of vendor service (5.7) and quality of vendor support (6.3) hurt the MicroLaser XL's overall score.

The QMS-PS 2000 earned its highest overall mark in quality of printing (8.5), although it finished third in that area. The printer lagged behind the others in ease of use (7.1) and expandability of RAM (6.6). Three users reported that the QMS-PS 2000 was difficult to configure in their LAN setups, while only one TI user and no HP users mentioned difficulties with their products in that area.

The three printers represent a range of prices, speed and function:

The LaserJet IIIsi is priced starting at $5,495, with advertised 17 page/min. speed and 13 bit-mapped and 14 scalable resident fonts included. The base configuration offers 1M byte of RAM. Maximum expanded memory is 17M bytes.

The 16 page/min. MicroLaser XL costs $2,399 and offers 14 resident fonts. Additional resident fonts can be included for a higher price. Standard memory for the MicroLaser XL is 512K bytes of RAM.

The QMS-PS 2000 is a 20 page/min. printer with 45 resident fonts, priced at $15,995. Its base configuration includes 16M bytes of RAM.

All three printers offer 300 dot/in. print resolution. Only three of the 70-user total response base said their printers did not live up to their advertised speed.

The most frequently named improvements that users would like to see added to the products were color support and enhanced graphics printing, a bigger paper bin, improved speed, more print features and better networking capability. Although users indicated that the products' ability to handle graphics printing duties was among the key ratings categories, 53 of the 70 total users also said they primarily use the products for text printing.

In response to a separate question about users' overall satisfaction, the LaserJet IIIsi scored highest (8.6), followed by the MicroLaser XL (7.7) and the QMS-PS 2000 (7.6). •

LAN-capable laser printers

Total scores reflect average user ratings for all measured areas, weighted by user-assigned importance. Response base: Hewlett-Packard, 30; Texas Instruments, 20; QMS, 30.

Product	Highest ratings	Lowest ratings
Hewlett-Packard's LaserJet IIIsi SCORE 83	Reliability Quality of printing Ability to print graphics	Support for multiple page description languages Responsiveness of vendor service Quality of vendor support
Texas Instrument's MicroLaser XL 78	Quality of printing Ability to print graphics Reliability	Responsiveness of vendor service Quality of vendor support Physical connectivity to network
QMS' QMS-PS 2000 SCORE 73	Quality of printing Ability to print graphics Reliability	Responsiveness of vendor service Sufficient expandability of RAM Quality of vendor support

KEY RATINGS

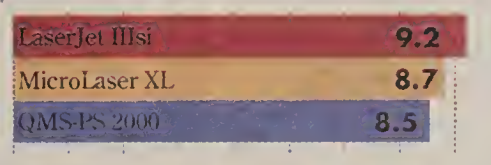
TI's MicroLaser XL earns the highest ranking in ease of use (8.5); HP's LaserJet IIIsi dominates the remaining key categories. The LaserJet IIIsi outdistances its competitors by a full point in the area users consider most important: reliability.

(Detailed ratings on next page)

User importance rating:

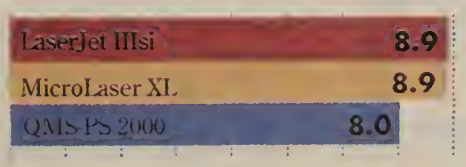
9.4 Reliability

9.1 Quality of printing

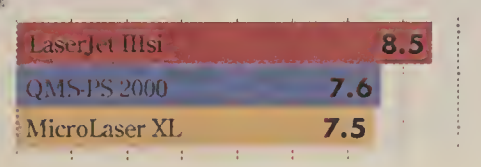


8.6 Value for the dollar

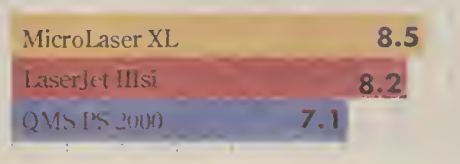
8.5 Ability to print graphics



8.3 Physical connectivity to network



8.2 Ease of use

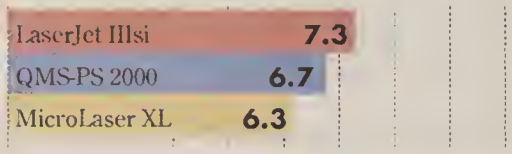


A CLOSER LOOK

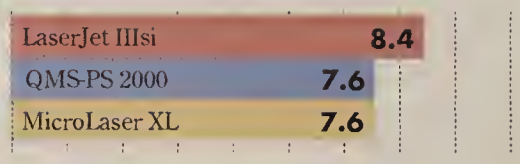
(LAN-capable 15 to 20 page/min. laser printers, continued from previous page):

HP's top-scoring LaserJet IIIsi gets highest grades in six of the nine remaining areas. TI 's MicroLaser XL ranks highest in support for networking protocols and multiple page description languages and handling of multiple-font pages but suffers from particularly low ratings in service and support areas. The QMS-PS 2000 stands second in four areas and last in the others.

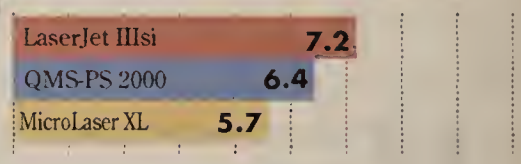
8.1 Quality of vendor support



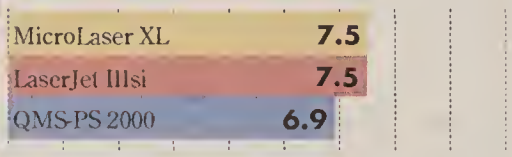
8.0 Speed



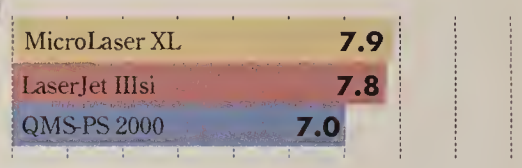
8.0 Responsiveness of vendor service



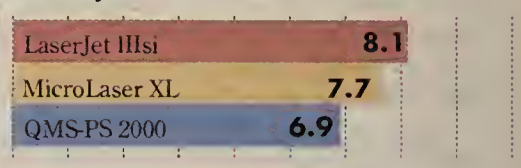
7.9 Support for networking protocols



7.8 Handling of multiple-font pages



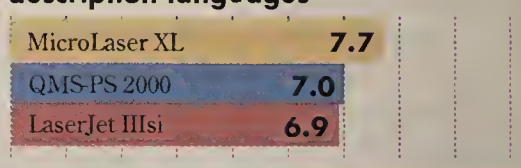
7.7 Quality of documentation



7.1 Sufficient expandability of RAM

6.8 Sufficient memory capacity on I/O port

6.7 Support for multiple page description languages



Verbatim

What do you like best/least about this product?
(Based on the most frequently stated answer. Quotes are selected from users' responses.)

LaserJet IIIsi

Likes

Reliability
"It takes abuse and still functions."

Dislikes

Networking capability
"It won't connect to a host and LAN simultaneously."

MicroLaser XL

Likes

Price/Performance
"The cost factor is good — doesn't go through a lot of supplies"

Dislikes

Poor design
"It spills toner all over due to a faulty dispense system."

QMS-PS 2000

Likes

Print quality
"Quality of print is good."

Dislikes

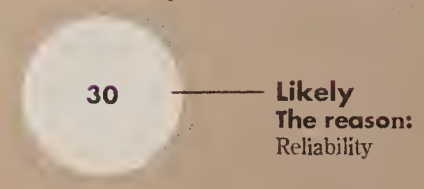
Price
"Original cost is high."

Loyalties

Would you buy the product again?
(Reasons based on most frequently stated responses)

LaserJet IIIsi

Response base: 30

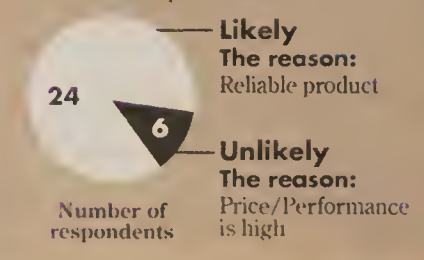


MicroLaser XL

Response base: 20

QMS-PS 2000

Response base: 30



Vital statistics

Total number of respondents: 70

What is your position?

IS director	8
IS manager	20
Network manager	7
PC manager	2
PC or network support staff	20
Other	13

How many years have you been using this product?

Five years or more	49
3-4 years	20
1-2 years	0
Less than one year	1

What is your responsibility for laser printers?

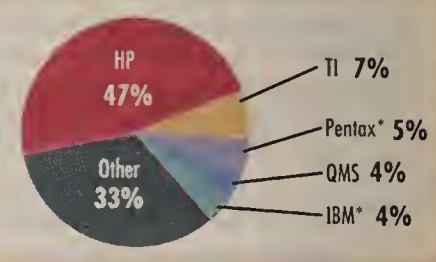
Evaluate or recommend vendors	50
Set standards	45
Determine need	44
Select vendors	40
Buy for end users	32

For which types of applications are you primarily using this product?

Text printing	53
Graphics-intensive printing	22
Other	11

Market share

Midrange laser printers
(Percentage of units shipped, 1991)



*The Pentax model is a continuous forms printer; the IBM models are for use with midrange systems rather than PC LANs.

Source: Computer Intelligence/Infocorp

METHODOLOGY

Products in this Buyers' Scorecard are market share leaders among local-area-network-capable 15 to 20 page/min. laser printers.

The response base was 30 users each for Hewlett-Packard Co.'s LaserJet IIIsi and QMS, Inc.'s QMS-PS 2000 and 20 for Texas Instruments, Inc.'s MicroLaser XL. Midrange printers from Pentax Technologies Corp. and IBM were not included in the survey because they are used for different purposes than the models listed. First Market Research in Austin, Texas, conducted the telephone survey and tabulated the results.

To compute the overall score for each product, perform the following steps: 1) Multiply the product's score in the first category by the user importance rating for that category to obtain the weighted score. 2) Repeat the process for all ratings areas. 3) Average the resulting figures for an average weighted score. 4) Convert the average weighted score to base 100.

The ratio of the average weighted score to the average user importance rating equals the ratio of the overall score to 10. Numbers are rounded where necessary.

ACKNOWLEDGMENTS

Computerworld thanks the following individuals and companies for their help in preparing this Buyers' Scorecard: Dan Ness, Computer Intelligence; Bill Gott, Computer Intelligence/Infocorp; Bryan Corrigan, BIS Strategic Decisions.

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The walk-and-wear office

Using a multimedia system and devices that track and identify people, Olivetti Research is working on the intelligent office of the future

David Povilaitis

BY ANDY HOPPER

It is morning, and I walk into the building in which I work and into an office I know is unoccupied. I make sure I'm wearing my identification badge, and as I approach the door, the electronic lock opens, enabling me to enter the darkened room.

The lights brighten, and a workstation on the desk flashes to life automatically, displaying a document I recognize as the one I had been working on yesterday. I click onto the screen and open a window, which updates me on my video mail messages. There is a beep, and a colleague's face suddenly appears on the screen in another small window. I click onto that window, and we talk in real time about the status of an upcoming project.

After we're done, I record a video mail message for another staff member to brief him on my recent discussion.

I then click on the screen to get a recorded version of the latest television news and finally find a minute to sip my coffee.

Science fiction? No, that's how a typical day begins for staff members like myself at the Olivetti Research Laboratory in Cambridge, England. Through our three years of work on and use of a multimedia system called Pandora and devices known as Active Badges that identify and track people, the lab has been piecing together the office of tomorrow.

Through our research and tools, we are making possible the idea of an "intelligent, shared office" in which a room can instantly adapt to a user's personal preferences (mouse buttons reconfigured for left-handed use or phone buttons programmed with personal codes) and in which tracking and video capabilities keep staff in constant contact.

Such flexibility gets rid of space and physical location problems, and the ability to customize

Continued on page 100

Hopper is director of the Olivetti Research Laboratory in Cambridge, England.

A foundation of network expertise

Set up in 1986 by Italian vendor Ing. C. Olivetti, the Olivetti Research Laboratory was formed to carry out leading-edge research in information technology. In 1991, Olivetti and DEC signed an agreement in which they would both fund the research center and use its research.

Olivetti Research's skills are built on networking expertise, and it was the application of high-speed, asynchronous transfer mode networks that led the company to explore multimedia in a networked office environment. Similarly, the related Active Badge project is based on networking concepts, but in this instance, the technology is low-speed infrared.

Research center staff is largely made up of post-graduates, many of whom studied at nearby Cambridge University. Staffers work on many joint projects with the Cambridge University Computer Laboratory, which is headed by professor Roger Needham. Andy Hopper, director of Olivetti Research, lectures at Cambridge, and students and academic colleagues frequently go to the research lab for project assistance and to share and explore ideas.

Olivetti Research work concentrates on solving problems. The lab takes ideas, looks to fashion them into working prototypes and then passes them on to others to commercialize and put them in a production engineering environment.

Continued from page 99
the work environment instantly may do wonders for efficiency.

Opening Pandora's box

The Pandora multimedia system consists of a group of networked, Unix-based workstations that provide real-time and recorded digital audiovisual information for users. Primary applications for the 20 Olivetti Research workstations include desktop videoconferencing and video mail.

A Pandora system (see photo) contains a video camera, a microphone, a loudspeaker and the Pandora processor box, which serves as the network interface. The current version of this box contains six processors, which work as embedded controllers with discrete functions.

One processor handles video sampling from the camera alongside the computer. A second acts as a digital video mixer to combine workstation-generated video with video coming from other Pandora boxes. The third processor deals with audio, which is handled at telephone-quality 8 KHz and is picked up by a microphone. Data stream switching is performed by the fourth processor, with two final devices serving as the I/O processors to the network. In this way, users can run video applications (controlled by the processor box) as well as other applications, such as word processing, from windows on their desktops (see story page 101).

Olivetti Research's Hopper *conducts a videophone conversation with professor Roger Needham, head of the Cambridge University Computer Laboratory, via their Pandora workstations*

The simplest use of Pandora is just observation. The staff at Olivetti Research can view remote offices through video cameras mounted over each Pandora station. Although it's perfectly permissible to peek at the scene surveyed by another Pandora station, a user can't listen to that station until somebody at that end lets him — i.e., accepts the call.

In addition, if a staff member surveys another office, the user in that office will always get an image of the surveyor on his screen. In this way, no one can observe without being observed.

In a two-way videoconference, Pandora handles four streams of digital video and audio: two incoming and two outgoing. Add one or two extra people to make a conference call, and the load increases exponentially. The system has no built-in limits, but as the processing demand increases, the visual quality drops (see story at left).

Sound is recorded separately from the video, but it is synchronized on playback. Because it's better to hear the conversation clearly than to see it, video is always sacrificed in favor of audio when data traffic reaches its limits. Typically, any user can have a four-way videoconference displaying five windows and mixing five audio streams on his terminal without overloading the system.

This load is one reason why Pandora utilizes an asynchronous transfer mode (ATM) network. ATM allows real-time performance to drop off gradually (we call this "graceful degradation") as the system becomes congested without losing the video or audio completely. ATM networks can chop up data streams very finely and preserve their real-time attribute.

By popular vote

By far the most successful Pandora application has been video mail. This involves recording short messages and sending them to other Pandora users — a kind of video fax.

Not only is it a lot faster to record a video message as opposed to composing and typing a written memo, but video mail is also a very personal form of communication that can convey expression and body language.

A message from the boss to drop by his office at the end of the day may cause panic — but if you see that he has a smile on his face when he says it, you will probably be less worried.

Video mail is quick and easy to record and play back. Videocassette recorder-style buttons are provided on the computer window, and the user can start, pause, stop, rewind and play back the recording at any time. A cursor or slider control lets him move immediately to a position in the recorded sequence by using the mouse, rather like scrolling text up and down in a word processor.

The right mix

There are cut-and-paste facilities for editing recordings and creating composite ones in which text and video is mixed. Video does not have to include only internal video. For instance, the laboratory has a directory of the latest recorded TV news that can be brought onto the screen at any time and viewed or recorded.

This broadcast data resides on a server that receives live TV relays and automatically records the news for users who want to view it later.

Video mail digital recording is stored remotely on a bank of Winchester disk drives, which currently provide about 2.5G bytes, or 6.4 hours, of recording.

Because typing a file name and dialogue text detracts from the simplicity of video mail, Olivetti Research is starting to work on voice pattern recognition for

Tech troubles

Clarity, connection time seen as concerns for Pandora

The code-name "Pandora" was given to the Olivetti Research multimedia system because the scientists weren't quite sure what "evils" might pop out of their research. While most of it has admittedly gone smoothly, a few drawbacks were uncovered:

- ▶Clarity and picture quality: These were not high priorities for the lab, which was more concerned that users could hear messages than that they could see them. Visual quality drops as processing demands go up.
- ▶Connection time. It takes about 20 seconds from the time a user requests a videoconference to full audiovisual linkup. It's a little like making a long-distance phone call before the time when direct-dialing sped things up.

Olivetti Research says it is addressing the issues of picture quality and connection time.

Where in the world a badge might go

The possible applications for Active Badges in the "real world" are varied.

For example, patients wearing badges in hospitals would be freer to move around because they could easily be located through sensors in case of emergency. In fact, incorporating a call-button feature right into the badge would enable patients to get urgent help immediately.

If doctors in the hospital were on the badge system as well, it would be easier to locate the nearest doctor to deal with an emergency.

Lawyers or other professionals who bill for their time and service could wear client-specific badges to keep tabs on time and costs. Items such as the number of phone calls to and on behalf of the client could be logged automatically.

Certain applications of Active Badges will be relevant to any profession. Ever rush to the printer to grab a confidential document before the rest of the office? With Active Badges, the document would not be output until you were "spotted" next to the printer, which would be equipped with a receiver.

But Active Badges are not only for people-watching. In fact, attaching smaller badges to objects may make it easier to track materials through a manufacturing process, monitor luggage in airports or find your car keys.

While work at Olivetti Research has been primarily with people, the lab has also been experimenting with object badges. Researchers have already attached full-size badges to the oscilloscope to keep tabs on who last used it.

The laboratory is just beginning to address some of the thorny issues of miniaturizing badge technology and making it more "robust" to handle some of the wear and tear that badges go through when attached to objects.

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filing and retrieving video mail. In this way, a user would simply state the name of the person whose video mail he'd like to see, and the system would search for and play back the messages sent by that person. As for filing, a powerful voice recognition system may eventually enable the system to produce an automatic transcript of a conversation as it takes place.

The video mail application is being isolated to run on standard platforms with a miminum of additional hardware and software. Researchers can already send and receive videomail from an Intel Corp. 80386-based personal computer running

An Active Badge *belonging to Andy Hopper containing his identification information. Employee tracking information is gathered by infrared sensors/receivers, which are connected using a low-frequency network.*

Microsoft Corp.'s Windows across a standard network. They can also send video mail to colleagues at Ing. C. Olivetti & Co. in Italy and Digital Equipment Corp. in the U.S. over standard public networks.

Future advances for Pandora will include features such as high-definition color and faster networking.

May I see your badge?

Pandora and Active Badge technologies interact in the areas of tracking and automatic, user-specific workstation setups.

The Active Badge system monitors the movement of people and, to a lesser extent, objects in the building. Everyone at Olivetti Research is issued a badge about the size of a typical office security identification badge. The Active Badge contains an infrared transmitter that every 15 seconds transmits a 48-bit word, which is the wearer's unique ID.

The ID information is held on a central database residing on a server and includes items such as security clearance, preferred computer interface and applications, right-handedness or left-handedness and even how the user takes his coffee.

Rooms, passageways and workstations in the Olivetti Research building are equipped with sensors with infrared receivers that monitor the presence of a badge. These sensors are tied together into a low-frequency network, which is connected to the server on the main Pandora network.

A central monitoring program on the server constantly updates a list of where badge wearers are or where they last came in contact with a sensor. This information includes what telephone or workstations they are closest to. Users can call up this list on their workstation.

Users can make an inquiry to locate a badge wearer in order to transfer a phone call or send a video message. The tiresome and all too common, "Sorry, he's here, but I don't know exactly where" message most of us are familiar with should eventually become obsolete.

Olivetti Research is experimenting with reconfiguring an office on the fly using the badges. For example, receivers in the Pandora system find out from the database what a user was last working on, enabling a researcher's work to follow him from computer to computer. Walking away from a terminal is the equivalent of logging off; approaching another screen "wakes up" the machine, which configures itself to whatever the user has specified. The computer even alerts a user to the fact that there is a video mail message waiting for him.

Monitoring raises privacy fears; iterative design may help

Monitoring technologies such as an Active Badge tend to conjure up the Orwellian nightmare of Big Brother — a boss or some other person watching what you do, where you do it and for how long.

Olivetti Research is trying to nip such fears in the bud by enabling users to take privacy measures such as putting a lens cap on the camera, placing Active Badges in a drawer or being able to access a list of who has been monitoring them.

But some observers in this area aren't so easily appeased and think that poor technology design and implementation may make for improper, and even immoral, technology use.

"Many companies and many people will try to assure you that monitoring will not be used against the worker. They're wrong," says Donald A. Norman, chair of the Department of Cognitive Science at the University of California at San Diego.

"For every organization that does not try to watch over the worker, there will be one that does," he adds.

Norman argues that technology has something he calls "affordances." For example, a table "affords" support; it makes it easy to support things. A pencil affords poking and prodding and writing. For its part, "technology that affords keeping track of people, believe me, is going to be used to keep track of people," he says.

That's not to say that Norman is opposed to work on technologies such as intelligent badges. What he is opposed to is research that is technology-driven instead of people-driven. He urges a slow and appropriate period of development, testing and technology introduction.

Including social scientists at the design stage to study the sociological implications of a new technology is imperative, Norman says. "The guideline here is iterative design. Without it, the social problems that result will be immense and may even drive out the technology."

LORY ZOTTOLA

Sensors can also transmit to badges, and the laboratory's Active Badge system incorporates paging functions, with which a user can page a colleague from a terminal.

Open sesame

Active Badges have been useful in determining security access. For example, sensors enable a security door to generate a small magnetic field. When an authorized badge wearer enters the field, his badge emits an instant pulse that can be checked for the appropriate entry permission and trigger the door to open. Or the sensor can differentiate among a number of badge wearers in the same room, preventing unnecessary interruptions of meetings.

No one is forced to wear these badges at Olivetti Research or Cambridge University, but the 130 people on the system do because it makes life easier.

There is less time wasted tracking someone down and fewer meeting interruptions. And with a built-in photosensitive resistor, it is always possible for a user to turn the badge over and effectively log off. Furthermore, all users have access to information on who is monitoring their whereabouts because inquiry information is logged and recorded. •

The ins and outs of Pandora

The Pandora system consists of a workstation and a "Pandora's box," a subsystem that handles video streams and the control of multiple real-time data paths. The workstation is used for high-level control functions and for interfacing to conventional software environments, while the subsystem concentrates on compression and control.

Pandora's box is a host-independent peripheral device to which a camera, microphone, loudspeaker, high-speed network, output screen, Active Badge sensors and private automatic branch exchange are attached. It takes, as one of its inputs, the video feed from the workstation and mixes in moving images from other sources. It produces a combined outgoing video stream that goes to the monitor.

At the highest software level, an extended X Window System is used to control applications. The user is therefore in an X Window environment with Pandora's box supplying the contents of X Window that show moving images.

The 20 Pandora workstations at Olivetti Research are tied together with Cambridge Fast Ring, a 50M to 75M bit/sec. ATM local-area network. These machines are also networked with computers at nearby Cambridge University Computer Laboratory through a 500M bit/sec. ATM bridge (see chart).

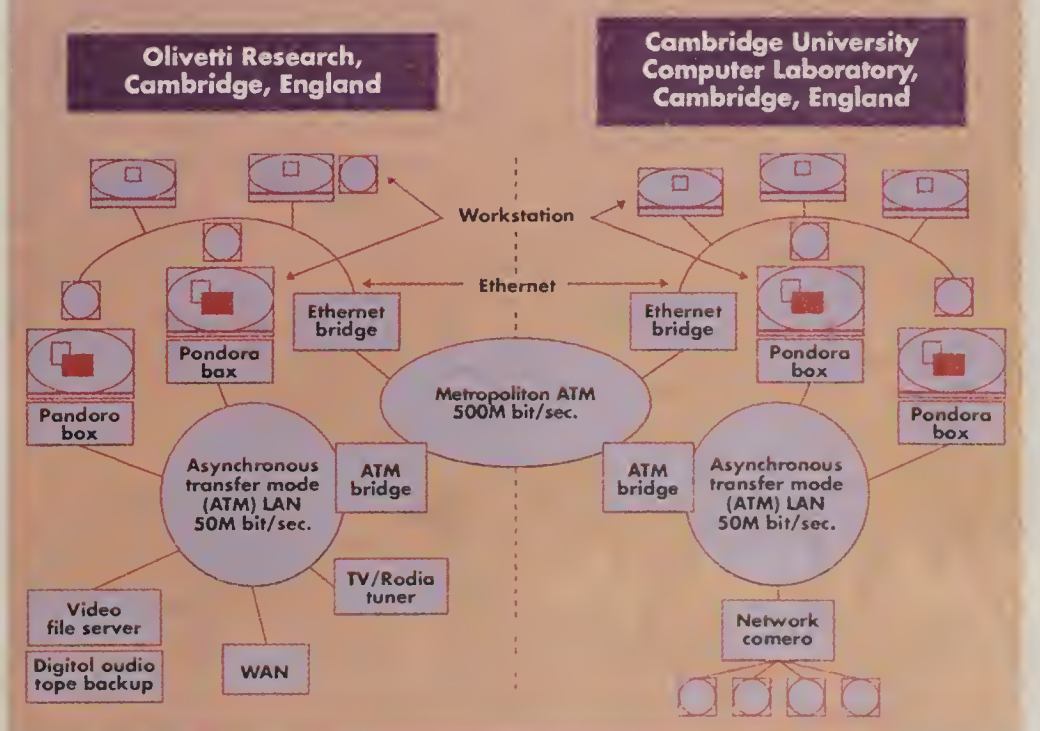
ATM networks can chop up data streams very finely and preserve real-time digital audio and video streams. Other high-speed networking standards, such as the Fiber Distributed Data Interface, have a "coarse-grain" effect that is not suitable for multichannel, real-time interactive applications such as Pandora.

An Olivetti Research project is in the works to provide a successor to Cambridge Fast Ring, called the Cambridge Backbone. The backbone has a potential 2G bit/sec. data transmission capacity, or 40 times that of the current network and 200 times faster than a typical Ethernet network.

ANDY HOPPER

What makes Pandora tick

How multimedia information gets around on the Pandora system



Source: Olivetti Research Laboratory

CW Chart: Michael Siggins

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IN BRIEF

Outsourcing user group to convene

■ The **Vendor Partnership and Outsourcing Interests Group** will hold its first members' conference May 12-13 in Atlanta. Formed late last year, the group includes about 20 companies interested in or already participating in partnership and outsourcing arrangements.

DuWayne Peterson, one of the group's directors and the former Merrill Lynch & Co. information systems chief, will speak at the conference. Other speakers include Donald C. Parcells, executive vice president of First Fidelity Bancorp, who will discuss his firm's contract with Electronic Data Systems Corp., and R. Dennis Wayson, vice president of market research firm Input, Inc.

Information about the conference and the group is available from Key Consulting Group, Inc. in Sherman Oaks, Calif. (818) 784-7755.

■ **Black & Decker Corp.** recently held its own worldwide IS management conference in conjunction with the Society for Information Management Institutional Member Conference in West Palm Beach, Fla. Sid Diamond, vice president of worldwide information services, brought together about 20 Black & Decker IS executives from the U.S., Mexico and Europe to attend the SIM conference and internal IS planning sessions.

SIM conference chairman Ray Hoving, a director of MIS at Air Products & Chemicals, Inc., encouraged other companies to hold similar concurrent meetings with SIM events.

■ Management consultancy **CSC Index, Inc.** has announced four promotions in its San Francisco office. James Hine, Belden M. Menkus and Jeff Rubin were promoted to principal from managing associate. David Anderson was promoted from senior associate to managing associate.

Goldman opportunities

Workhorse CIO banks on Chase achieving ambitious technology goals

BY ROSEMARY HAMILTON
CW STAFF

Mike Mandelbaum, an information systems vice president at The Chase Manhattan Bank NA in New York, says there have been times when he has arrived at work very early only to find an electronic-mail message from his boss waiting for him.

"It can be disheartening when you come in at 7:30 a.m. and [discover that] your boss has already been there for a couple of hours," Mandelbaum says.

The boss is Craig Goldman, chief information officer at Chase, who readily describes himself as driven and intense. Yet, despite his devotion to his job, Goldman, 48, does not expect others to share his work schedule, staff members say. Goldman has more important things on his mind.

"I push myself very hard, and I have lots of balls in the air at one time," Goldman says. "I've got a sense of urgency to meet the objectives we've agreed on as important."

The key objective for Goldman, who was appointed CIO at the end of 1991, is to establish Chase as the recognized technology leader in its industry. That is easy enough to say, but the implementation is far more complex and includes several initiatives.

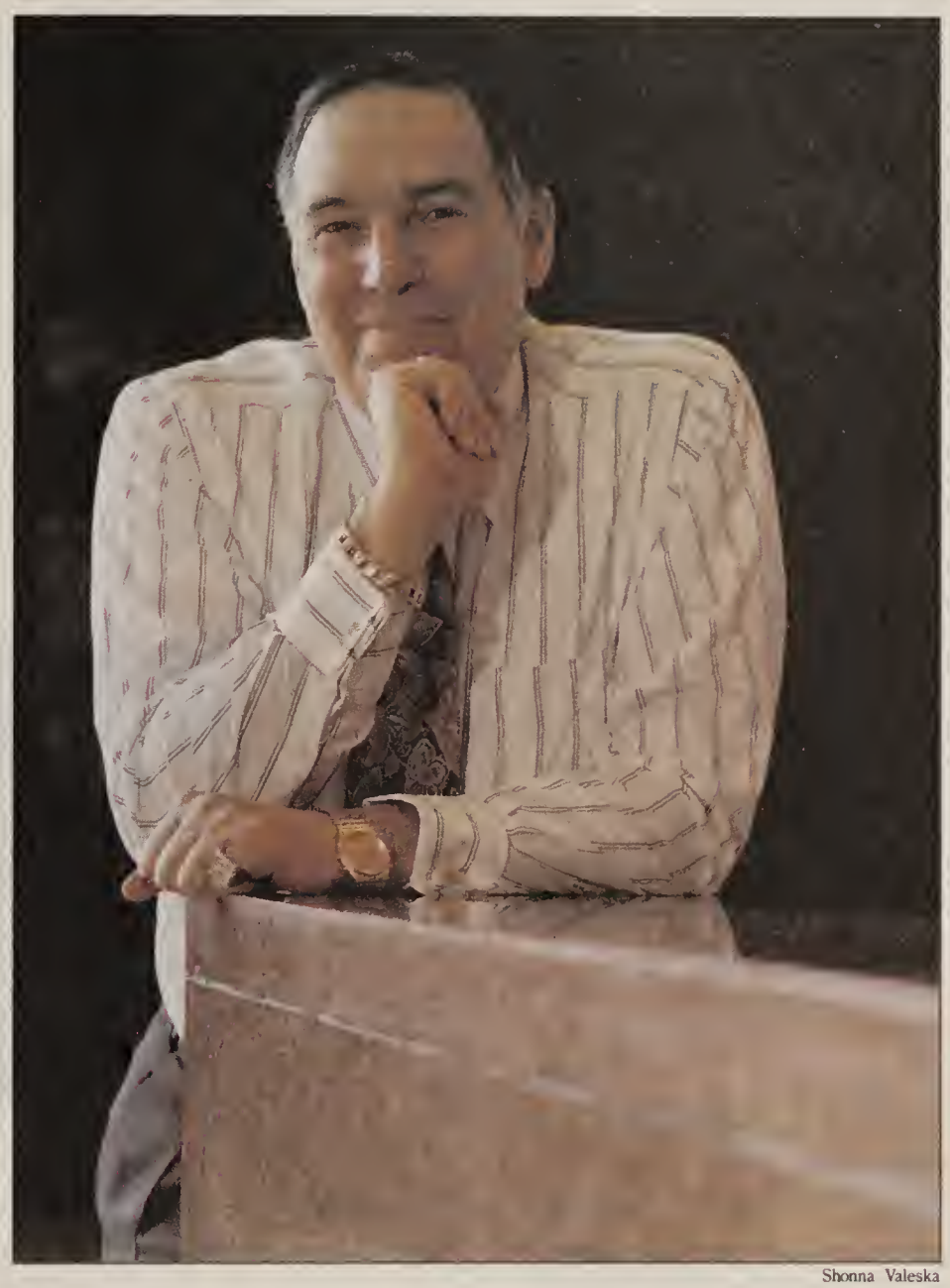
Goldman is juggling the following management and technology issues to achieve his goal:

▶Motivate 4,000 worldwide IS employees through a series of training and recognition programs so they feel productive and want to excel.

▶Promote Chase's technology efforts

Continued on page 104

PROFILE: Craig Goldman



Shonna Valeska

Position: *CIO at The Chase Manhattan Bank NA*
Mission: *To establish Chase as the recognized technology leader in banking*

What's behind the CIO revolving door?

BY JIM NASH
CW STAFF

Having just gotten used to the chorus "America's newest business heroes," chief information officers are hearing a different refrain: "Don't let the door hit you on your way out." Pink slips have become so common in the information systems executive ranks that people are looking into the reasons behind the trend.

"CIOs are being pushed out by cost-conscious CFOs," said Don Winski, an adjunct professor of IS at the New York University School of Business and former CIO at Time Warner, Inc. Winski is currently pursuing academic research on the topic of CIO turnover.

IS professionals — once looked on with a mixure of reverence and suspicion reserved for court wizards a millenium ago — have lost their mystique. "IS cannot carry the fat and deadweight anymore," said John Davis, president of John J. Davis & Associates, an executive search firm in New York.

Davis has been asking firms nationwide why they have CIO vacancies, how long they have had openings and what they want for replacements.

Davis said the average tenure for IS leaders continues to recede, falling from three to two years recently. "Companies want administrators who manage IS departments closer to the bone," Davis explained. This contrasts with the previously popular executives who are "more strategic, ethereal; with less of a focus on the deliverables." Those who do not fit the new mold are being asked to leave.

Covering all basics

Winski's theory is a bit more complicated. "CIOs wear a three-cornered hat," he said. One corner is for delivering basic computer performance at the lowest cost. Another represents proactive duties that involve business re-engineering. The third is for participation in helping the firm provide new products and services, such as automated teller machines and American Airlines' Sabre reservation system.

Companies demand that the basics be covered, preferably by the CIO. If CIOs have sold themselves as executives who can provide the other two responsibilities — and actually do so — they are relatively safe, Winski said. But if IS executives cannot deliver on all three, firms are not willing to pay for them to grow into the position.

Goldman opportunities

CONTINUED FROM PAGE 103

inside and outside the bank so it receives respect and recognition.

► Champion IS projects that use emerging technologies, such as multimedia and groupware, so Chase can beat its competition.

► At the same time, insist on practical implementation of technologies as business tools, including the creation of systems based on corporate standards.

Goldman's drive took him from a technician's job straight out of high school through four years of night school at New York University. He then joined Pan American World Airways in 1964. Goldman spent 19 years there, finishing off as head of all Pan Am development, excluding reservations. In 1983, he was appointed as an operations and systems executive at American Plan Co., an insurance holding company in New York. He then moved on to Chase, where he was put in charge of operations and systems for the North American sector in the late 1980s.

Suited to fit

Last year, Chase created the post of CIO for the first time, and Goldman was promoted to it. At the time, Elaine Bond, who was senior vice president of corporate systems, functioned as the unofficial CIO. She is now assuming a technology advisory role at Chase.

For Chase to become the technology leader, Goldman works the pieces of his strategy diligently. "He's very involved in the results, and he wants to make sure they will work," Mandelbaum says.

Goldman has several training programs under way. One educational effort is built on a "learn at your own pace" concept. Employees are encouraged to use an IS library of video- and audio-training tapes on their own time.

Another project has resulted in the Centers of Excellence, which are groups of employees throughout IS that have outstanding talents in a given area. These teams work together to share their knowledge with the staff and stand ready as experts-on-call.

While Goldman boosts his troops, he is also devoting a big chunk of time to promoting their achievements. He sells the IS efforts to Chase itself, he says — not too difficult a task because some key senior managers have technology backgrounds. "I look at my role as not being a technology evangelist, but as a business partner and part of the corporate team solving the overall business problems," Goldman says.

The efforts to promote IS to the industry are more critical, according to Goldman. By making Chase an active player in the industry, through participation in industry conferences and standards bodies, the bank can learn from its peers, he says.

"The people who think everything is centered around their corporation with little [outside] exposure are not the people who will distinguish themselves in the future," Goldman says.

Gene Friedman, vice president of advanced technology, says Goldman's ability to communicate is his best quality. "He's very accessible — period — [and] not just to the press. He goes out of his way to speak to vendors. When you talk about his long hours, I believe part of that is driven by his desire to be accessible."

Meanwhile, Goldman is involved in many systems projects. He's a champion of emerging technologies and is pushing ahead with relationships Chase has established with vendors to test new products. While there may be a risk to being on the so-called bleeding edge, Goldman says, the benefits outweigh that concern.

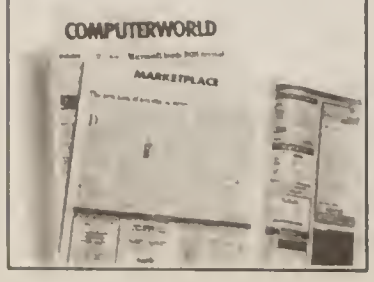
This approach allows Chase to request functions early in the product development cycle and gives the bank the advantage of getting products ahead of its competitors. For example, Chase was an early user of Lotus Development Corp.'s Notes workgroup software [CW, Jan. 27]. The bank worked with Lotus to include such functions as image support in Notes. Chase now runs a substantial Notes network while many other companies are just exploring the concept of groupware.

The bank is moving into a new IS facility in Brooklyn. Eventually, 6,000 employees will work there, and Notes will be installed on every desktop.

As much as Goldman promotes new technology, he demands that it be implemented for business purposes and in a consistent fashion. For instance, Chase is installing Microsoft Corp.'s Windows because it allows the firm to establish a standard graphical user-based front end.

The CIO slot requires so much of Goldman's energy that his hobbies of photography and candle-making are on the back burner for now. "But it's OK," he says, "because I'm having fun. Fortunately, I have a very patient wife, who's also in this business. She's very patient and understanding. That's my greatest asset."

Check out the Marketplace Pages on Page 117.



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Smaller not always smarter

■ A new survey by Right Associates, a Philadelphia consultancy, finds that downsizing has not had much effect on companies' bottom lines. Seventy-five percent of the 1,204 surveyed U.S. firms had downsized during the past five years. Three-quarters of those said downsizing had not improved their financial performance, and two-thirds saw no improvement in productivity, according to Virginia Lord, who conducted the survey.

Source: *"Pink-slip productivity,"* The Economist, *March 28, 1992.*

Dose of reality

■ Conventional wisdom has always said information systems give managers a jump on competition by enabling them to find and address problems faster. In reality, however, "most managers don't have the faintest clue of how to use the information properly to take advantage of opportunities and correct problems," Martin R. Smith writes in his new book, *Contrarian Management.*

Many managers try to cover their ignorance by requesting numerous reports to make it look like they know what they're doing, according to Smith.

Often, Smith adds, IS managers — who he calls the Caliphs of Computerville — compound the problem by collecting information they have decided is important to managers. "Too many times, the Caliphs use this approach to build the size and importance of their department. If you play their game, you are adding unnecessary costs to the company your livelihood depends on. Don't fall for it!"

Source: Contrarian Management: Commonsense Antidotes to Business Fads and Fallacies, *by Martin R. Smith, Amacom Books, 1992.*

Dell on customer contact

■ "You do 100 push-ups a day, you get a strong upper body. You talk to 10,000 customers a day, you know what the customer wants."

Source: *"Still think he's just a kid?" Interview with Michael Dell by Rich Karlgaard.* Upside *magazine, March 1992.*

Making up for lost time

■ Managers who are constantly faced with staff members waltzing into meetings "fashionably late" should consider the following to improve their timeliness: Schedule meetings at unusual times instead of on-the-hour to get people's attention. Start on time, no matter who's missing. Close the door at the start of the meeting to signal to latecomers that their late entrance is disruptive. Cover the most important business first to reward those who are on time. To pique latecomers' interest, inform them of items of interest before the meeting. Confront offenders in private and stress that their input at meetings is important. Incorporate staff presentations into the meeting because people tend to listen to their peers.

Source: *"Seven ways to get people to meetings on time,"* Working Woman, *February 1992.*

Maintaining maintenance

■ The word "maintenance" has acquired a negative connotation. Most people don't realize, when they hear about the large amounts of resources dedicated to this kind of activity, that maintenance comes in several forms. There is perfective maintenance, which provides additional benefit or value to the user; adaptive maintenance, which adapts to the changing needs of the business or market; and corrective maintenance.

Source: *"Could anything possibly change?" by Alan Howard,* System Development, *February 1992.*

The new office

■ "The central office will become mainly a place where workers from satellite and home-based offices meet to discuss ideas and to reaffirm their loyalty to fellow employees and the company," predicts Frank Becker, a professor at Cornell University who studies the patterns of office work. Becker sees common areas, such as the copy machine or water cooler areas, gradually becoming the heart of the office.

Source: *"The eternal coffee break," Management Focus column,* The Economist, *March 7, 1992.*

Learning from mistakes

■ Stride Rite's Chairman, Arnold Hiatt, says his, "personal struggle has always been how far to let someone else go. I'll see someone in the company doing something I know isn't right, because I've been there myself too many times before. But then I grit my teeth and remind myself that I never learned anything by listening to someone else preach. The mistakes I made were my best teacher so far."

Source: *"Building Corporate Character: An Interview with Stride Rite Chairman Arnold Hiatt," by Nan Stone,* Harvard Business Review, *March-April 1992.*

Compiled by Kelly E. Dwyer, assistant editor, features.

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Finding the time to do it all

BY EMILY LEINFUSS
SPECIAL TO CW

You need to complete this quarter's budget by tomorrow morning. You finally get a good head of steam going and are performing an intricate calculation when someone knocks on your door to report that he spilled coffee on his keyboard. The unwelcome interruption sends you into a rage, and you tell the unlucky bearer of bad news to take his keyboard and...

Sound familiar? Well, Michael Brown, manager of computer operations and software at Liquid Air Corp. in Walnut Creek, Calif., might have gone into such a rage if he hadn't applied time management techniques. He reserves a block of time and lets his secretary know that he is not to be disturbed except for emergencies.

Information systems managers who have adopted some time management skills say they have increased their efficiency, feel much more in control of their work loads and are not as stressed, which makes them less likely to experience the above scenario.

"Systems people are constantly getting interrupted by problems — a job blows up or payroll doesn't run. If you let them, these difficulties will end up pushing more important tasks to the side," Brown says.

It is not just the day-to-day fire fighting that steers IS professionals away from crucial tasks. Managers are having to do more work with smaller staffs, and competitive pressures are shortening product development life cycles, forcing IS people to perform faster and more effectively.

With all these extra pressures, changing your current work patterns may be the only way to accomplish everything there is to do. This includes all the regular work — be it applications development, troubleshooting or managing employees — plus keeping up with technology, planning, meeting with colleagues and still managing to have a life.

Time management is more than carrying around a Daytimer or electronic calendar. These tools, while useful in scheduling and carrying out the work, do not address the real issue of effective time management: assessing priorities.

This process begins with identifying your most important basic values and principles and incorporating them into a personal mission statement, says Darrell S. Corbin, a systems analyst at The Boeing Co. in Renton, Wash., and chairman of the Association for Systems Management Education Advisory Committee.

The next steps are straightforward, Corbin says: Establish goals that are consistent with your values, identify activities to accomplish the goals, create schedules and assign responsibilities — all in writing. "The goals need to be realistic, compatible, specific, positive and have completion dates," he says.

"I look at anything that has an impact on the whole organization as a top priority," says Elaine Giddens, director of IS and telecommunications at the Atlanta-based law firm of Powell, Goldstein, Frazer & Murphy.

For example, Giddens says, most of the lawyers at her firm are unhappy with the calendar on their local-area network-based electronic-mail system, so she is evaluating others that may be more useful. That work is more important than serving the one user who is searching for a database, she says.

For Richard Hock, director of MIS at Echlin, Inc. in Branford, Conn., priorities tie directly into the company's business plan. "The first priority goes toward supporting operational systems, the second goes to new development and the third is planning and self-education," Hock says.

Self time important

Priorities can sometimes be unrelated to work. Karl Swanseen, director of MIS at Trump Plaza Hotel and Casino in Atlantic City, says that despite his busy schedule, he recently took time off to attend his daughter's poetry recital at school. "You need to take the time to take care of yourself, to get what you need," he says.

Brown agrees that time out helps one stay effective. "If I am getting really stressed out and things are crazy in the office, I might schedule a mental health day and go to the beach," he says.

Scheduling self time and time for planning and research is central to effective time management. Giddens gives herself time early in the morning: The workday starts at 8:30 a.m., but she is in by 7. "That is my time. I look at ongoing work, read, check on events I may want to attend or take action on," she says.

Dave Borlin, director of central computer services at McDonnell Douglas Aerospace Information Services Co. in St. Louis, has a trick to get time for research and forward thinking. He schedules time in the firm's electronic calendar to make it look like he is in meetings, but then he stays in his office doing development activity or strategic thinking.

Sometimes the whole department can decide to work together to schedule self time. Corbin says that in his last job, the IS organization decided to give every person a quiet hour during which they could focus on research and forward thinking. The feedback was positive. "People were able to really concentrate and plan things out as opposed to starting to work and then having to go fight fires," Corbin says.

For Borlin, the problem with managing time is not that there is more to do in a workday but that there are less people to do it. Companies, if not actively downsizing, are not replacing employees who leave. To cope with these demands, Borlin believes in empowering employees.

"Empowering is a form of delegation. You give them the responsibility, the authority and the tools to do a job by themselves," he says.

Leinfuss is a free-lance writer based in Sarasota, Fla.

Secrets of time extension

- Assess your priorities.
- Schedule your tasks, including a quiet time.
- Keep to your schedule. Don't get distracted.
- Learn to judge your most productive time of day and use it to your advantage.
- Schedule company meetings to review accomplishments and to make sure you are keeping with corporate or IS direction.
- Develop a regular outlet to meet with peers.
- Empower your employees to take responsibility for their work.

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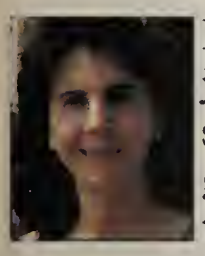
Job search: Don't just hope for the best



If you are thinking about switching jobs, one approach is to conduct a staged analysis, looking first at the general characteristics of the industries you might search, then at the life-cycle qualities and cultures of specific firms within those targeted industries.

Trying to characterize a whole industry isn't an excercise in precision. Individual companies have their own styles and personalities, but often there are substantial similarities among companies engaged in a particular type of business.

Here are some of the things to look for when trying to decide what industries would provide a comfortable next job for you:

- Industry pay scales.
- Cultural norms.
- The degree to which information systems is regarded as central to the business.
- The commitment to ongoing training.
- Advancement potential.

Banks and insurance firms, for example, tend to be conservative in their policies and modus operandi. Corporate policies and communications modes are often fixed and formal, and a certain amount of propriety in dress is generally required.

Respected position

Systems professionals are highly regarded employees because automated banking, pension plan computation and mortgage processing are the heart and soul of business today.

Mutual fund companies and brokerage firms also fit this mold, but because they are experiencing much greater growth, they may bend the rules a bit.

In financial services companies, IS training is budgeted as a priority, and depending on the company's profitability, some have in-house personnel to develop and conduct training programs. Training encompasses technical areas such as programming languages, analysis, design and management.

Manufacturing companies tend to employ a wide array of people, from shippers and receivers to assembly-line workers, accountants and salespeople. The IS departments in manufacturing environments support in-house functions, giving personnel stimulating opportunities to work with all kinds of people, such as shop-floor workers and line managers.

As new ideas are slowly phased in across different areas of manufacturing — such as the infiltration of computer-aided design and manufacturing and other shop-floor systems — the IS professional is slowly emerging as a critical component in the industry's success.

In manufacturing companies, training may not be the top priority and often depends on how well a company is performing.

Software services is a relatively thriving industry characterized by rapid growth with lots of new start-up companies and a few giant powerhouses. There is a lot of opportunity but also a fair amount of risk: Many mergers are going on, and the "hot" product you may be working on could soon become obsolete. The culture tends to be fast-paced, informal, competitive and project-driven, and as a result, these companies tend to seek and attract creative self-starters.

Major software firms may have established training centers, while smaller firms may tap experienced employees for informal training. Some of the firms have a body shop mentality where talent is bought in the marketplace, and therefore, minimal training is needed.

MOST COMPANIES and industries go through a growth cycle where they progress from fledgling start-ups to stable cash cows. Each stage can offer different opportunities.

When deciding whether to work for a given company, get its annual report, ask for public relations literature, talk to a stockbroker, interview employees, and ask a recruiter for information on that particular company.

Perfect fit

You want to find a field and a job that fit your personal and professional style. If you are a conservative, button-down type, you may not want to work for a techie, informal software company.

Conversely, if you are a creative systems genius with a desire to work in jeans, maybe you would not want to work in a stuffy banking environment. Walk around the company that you would like to work for to get the lay of the land.

Most companies and industries go through a growth cycle where they progress from fledgling start-ups to stable cash cows. Each stage can offer different opportunities. For example, in the beginning, maybe the systems person is trying to get as many basic systems up and running as possible, where the mature company may demand more sophistication and in-depth analysis and design. Looking to see what stage a company is in requires market share. Smaller companies may offer more opportunities for growth, but benefits may be fewer. A larger, more established firm may offer a more structured environment and better benefits.

Each opportunity is different, and getting the most information you can about a company before accepting its job offer is key in your decision-making.

Harrington is a section manager in the Advanced Technology Division at Synetics Corp., a software services firm in Wakefield, Mass. She has 11 years of experience in the computer field and has consulted at many New England firms.

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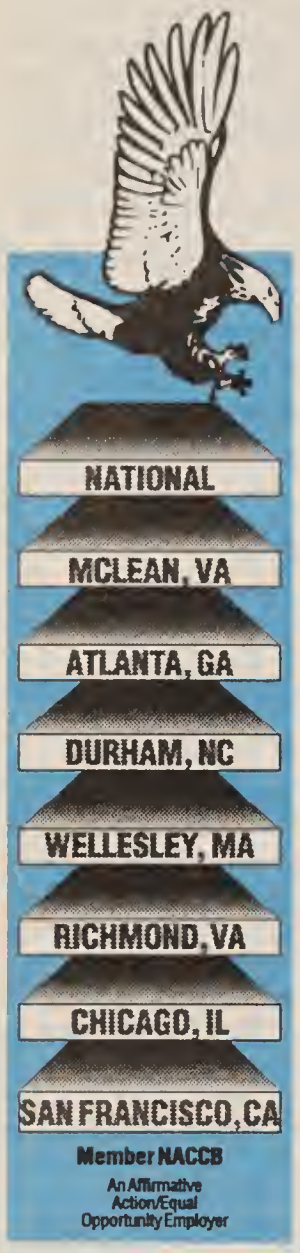

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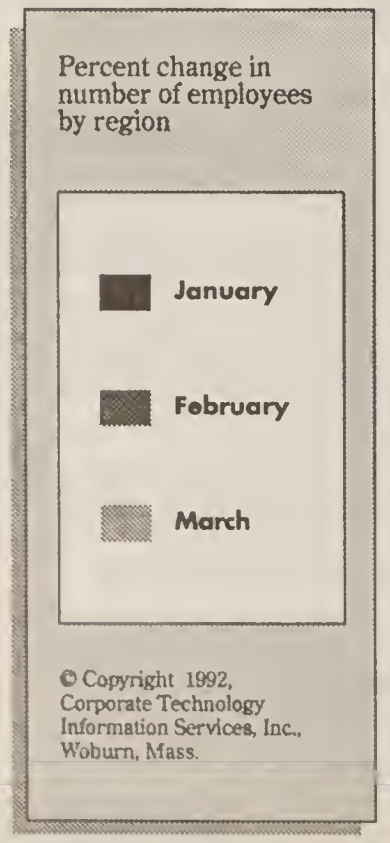
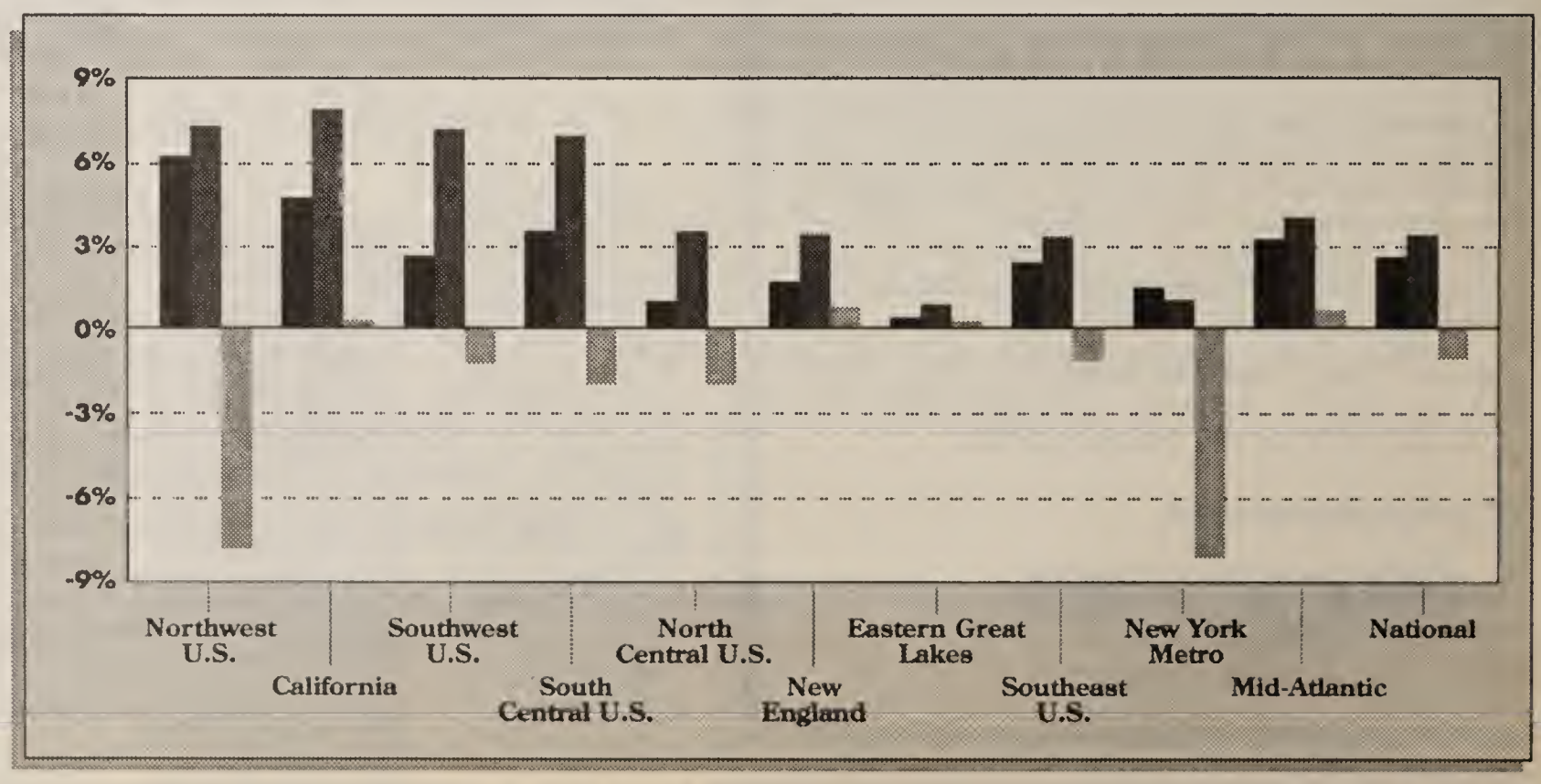
Computerworld/Corptech Career Index

On a national scale, the technology industry has seen better months than March when it comes to employment — February, for instance.





Opportunities ripening in Florida

Healthy industries include import/export and Disney

BY JILL VITIELLO
SPECIAL TO CW

The Sunshine State is not living up to its name in terms of information systems jobs. But there are some bright spots: Layoffs seem to have ceased, and while virtually no company is increasing its IS numbers, some replacement hiring is taking place, and contract workers as well as people with specialized skills are finding some opportunities.

"We're carefully hiring people" to maintain a staff of around 95, says Thomas Loane, vice president of data processing at Alamo Rent-a-Car, Inc. in Fort Lauderdale, Fla.

Although the national recession hit Florida somewhat later than it hit other regions of the U.S., the strong IS market gave way two years ago to layoffs, little turnover and practically zero growth. As in the rest of the nation, managers are hard hit by the trend toward flattening management structures. Meanwhile, people with up-to-date technical skills continue to thrive.

The companies that are expanding their IS departments are aggressively seeking professionals with unusual skills. For example, the American Automobile Association (AAA) in Lake Mary, Fla., was recently seeking a programmer with a background in cartography, according to R. E. Fox II, managing director of IS. AAA, with a central IS group of 55 based in Lake Mary, is working toward going on-line with its member automobile clubs' maps and tour books. The association also sought a data administrator — not a data processing administrator, Fox clarifies — to manage the flow of business information.

"We ended up searching nationally for those specialized skills," says Fox, who was able to fill both posts.

IS professionals with additional experience in other disciplines — such as marketing, operations research and finance — are a hot commodity at Ryder System, Inc. in Miami, where Dennis Klinger, vice president of MIS, plans to do "very selective" replacement hiring this year to maintain his staff of about 350 employees based in South Florida.

Firms not in a position to hire full-time workers are using part-time employees or contractors to manage heavy work loads or major projects. Moonlighting programmers are welcome at Chase Federal Bank in Miami, which downsized its IS area by 40% last year. Paid on an hourly basis, the workers are experienced, and they get the job done, according to Anwer Ali Perbtani, vice president of MIS.

With about 60 IS professionals on staff, Royal Caribbean Cruise Ltd. in Miami brought on a large number of contractors to help the cruise operator rewrite its reservation systems, says Jim Morrel, operations facility analyst.

As short-term or extremely specialized as these job opportunities are, they provide some hope that the worst is over. They are a positive change from the severe cutbacks some companies made over the last two years. Layoffs have abated, after having been rampant in such industries as savings and loans and defense. The state government is not creating new IS jobs, but neither is it planning to cut them, says Ron Morem, bureau chief of computer services at Florida Banking & Finance Department, a regulatory agency in the state's capital of Tallahassee.

North meets South

One thing that distinguishes Florida from other states is its unique economic base. Attracted by its warm climate, low real estate prices and subsequently lower salaries, many corporations based in the Northeast and Midwest have established subsidiaries and divisions throughout the Sunshine State.

Today, healthy industries in Florida include tourism, commercial banking, insurance, transportation, health care and import/export. The "Disney" economy supports hotel, car rental and restaurant businesses in the Orlando, Fla., area, where Walt Disney World, Disney MGM Studios Theme Park and Epcot Center are located.

IS workers need to strive to grasp characteristics of the 1990s' IS professional, a profile which combines technical ability with business acumen and superior communication skills, says Richard Wonder, national director of the IS division at Robert Half International, Inc., a placement firm with several Florida offices.

The Florida economy has its bright points, but no one is urging individuals to "come on down." That invitation is aimed at corporations thinking about creating jobs in the state. Many observers say that's where the next wave of growth in IS and other sectors will originate.

Vitiello is a speech writer and free-lance writer based in East Brunswick, N.J.

Source: National Association of Realtors

Source: Florida Department of Commerce, Bureau of Labor Market Information

Largest employers — September 1991
(By number of employees)

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- Kmart Corp.
- Publix Super Markets, Inc.
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- Wal-Mart Stores, Inc.
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Source: Florida Department of Commerce, Bureau of Economic Analysis

Source: 1990, 1991 *Computerworld* salary surveys

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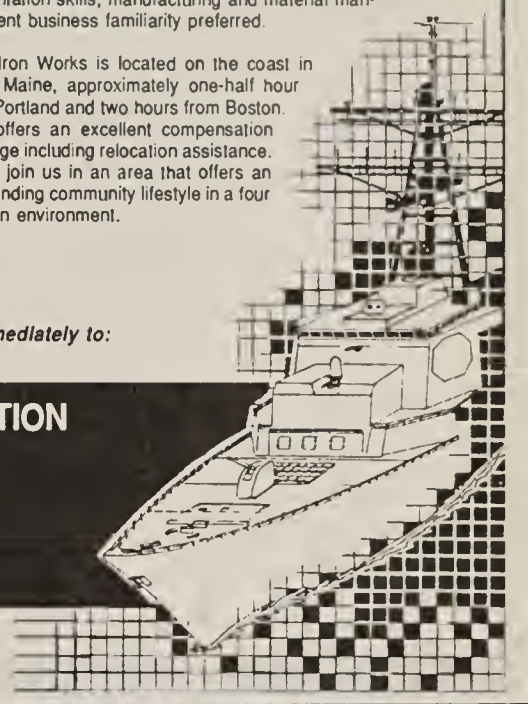

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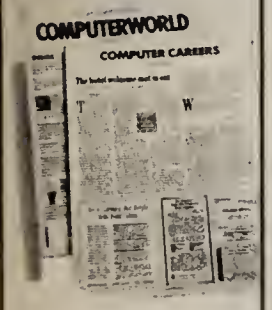

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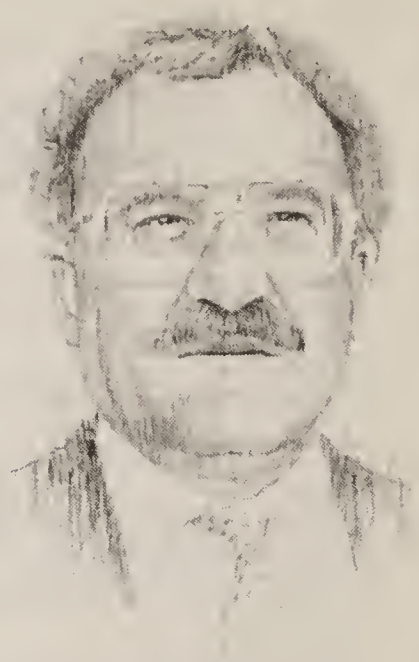

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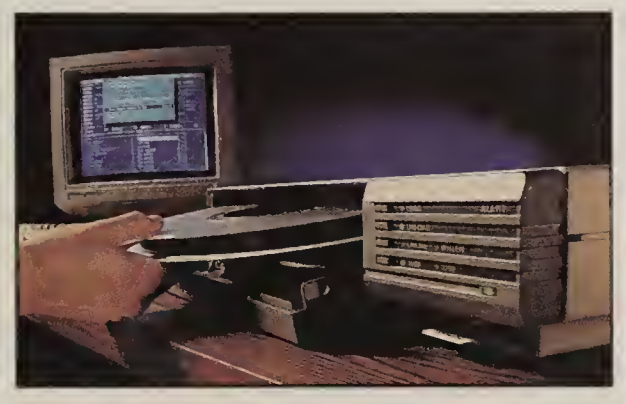

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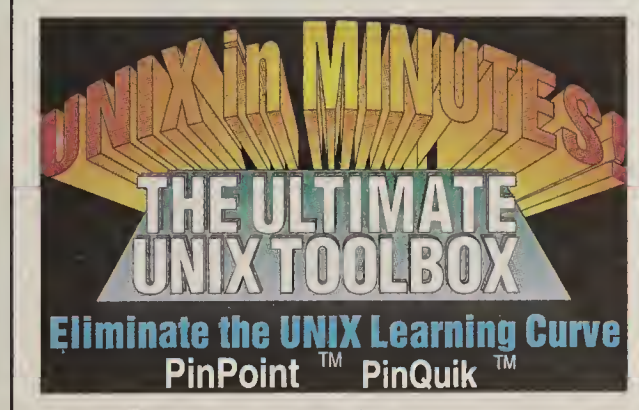

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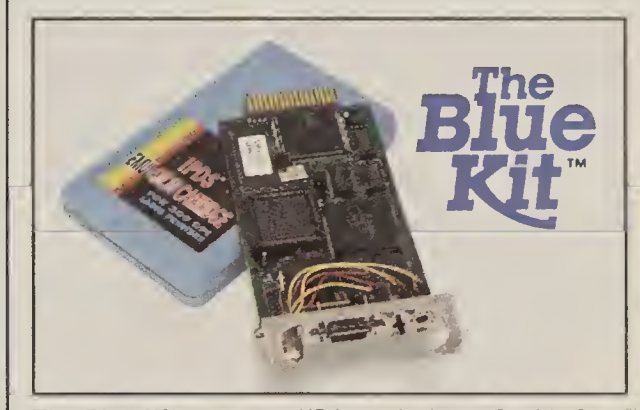

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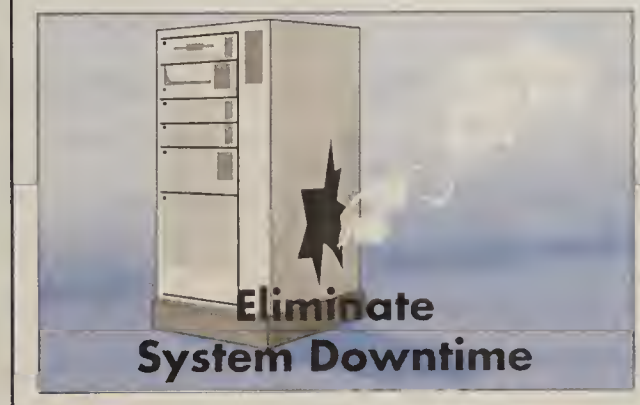

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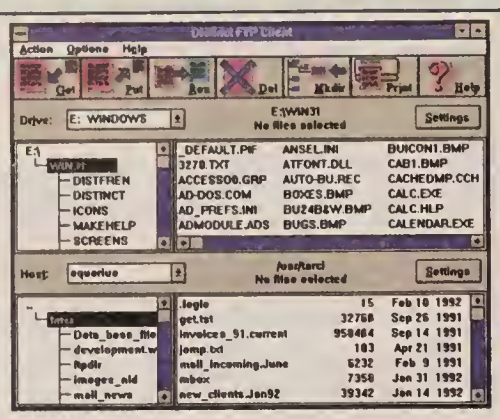

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Lead tracking software: Something for every budget

BY ALICE BREDIN
SPECIAL TO CW

Faced with needing to make the most of their time, many sales departments have turned to personal computer-based lead tracking software to handle paperwork, organize schedules and track leads.

For Vulcan Materials Co., a producer of construction aggregate in Birmingham, Ala., using lead tracking software has also meant a 17% increase in sales calls for each representative, says Vulcan Materials' market analyst David Worthington.

These and other benefits have sparked an interest in lead tracking products, which not only offer diverse functionality but are more customizable as well.

Designed to handle large amounts of data, lead tracking software enables a user to keep a database of potential clients and transactions, with the goal of turning a prospect into a customer. The 300-plus-vendor market ranges from off-the-shelf products starting at $300 to customized packages that can cost more than $4,000 per user. The higher the price, the more flexible and customized is the product.

However, users and analysts agree that no matter what the price, there are some features that are must-haves.

Sales analysis or sales reporting functions, for instance, allow a user to look at overall sales activity and determine which tactics work, what advertising brings in leads and who is making sales. "To make lead tracking meaningful, you have to have some way to analyze your results," says Kathy Barton, marketing manager of sales systems at General Electric Information Services in Rockville, Md.

Using an integrated relational database on top of a flat database is also important.

"If you are selling 10 different products to many people at many locations, a relational database gives you different ways to keep track of relationships," says Hilary Mine, a research analyst at Market Intelligence Research Corp. in Mountain View, Calif. This can be done by name, title or other parameters.

Flat databases, however, allow information to be accessed and analyzed in only one of these ways.

According to consultants and users, however, the most sought-after characteristic is the ability to customize the product.

With most off-the-shelf products, what you see is what you get, with only some allowing users to choose how the data is organized. High-end products, however, can be extensively tailored, either by changing the way the data will be managed or adding extra capabilities, such as mapping travel routes for off-site visits.

Tailor-made

Vulcan Materials' sales representatives, who quote an average of 30 or 40 prices a day selling construction aggregate, chose Atlanta-based Brock Control Systems, Inc.'s Field Activity Manager because they needed a package they could tailor.

Worthington says the product, priced at $1,500 per user with a six-user minimum, offered many choices for how the fields could be set up and "gave us the most flexibility to develop a quoting system."

Analysts also advise customers to make sure the software allows information fields as well as whole files to be transferred. "If you have to send the entire file back once you change a phone number, that will cost more and take longer than if your [software] can transfer only the field that has changed," Barton says.

Most products also include word processing applications, and some can even export data to a word processing package. "A lot of the word processing packages within the software aren't too sophisticated, so you may want to import your own or export your text," Mine says.

As with most other software, ease of use is one of the most obvious but overlooked features for buyers, analysts say.

Johnson Abrasives, Inc., a Jaffrey, N.H.-based abrasives manufacturer, purchased Sales Ally, a $395-per-user product from Scherrer Resources, Inc. in Philadelphia, to support its eight-person sales staff.

Sales Ally "took our sales representatives about one week to learn," says Courtland Johnson, Scherrer president.

ACT, by Contact Software International, Inc. in Carrollton, Texas, also cited as being easy to use, is "good for people not trained in computers," says Mel Boudin, an information systems analyst at a Miami-based medical supply company.

Bredin is a free-lance writer based in New York.

Start small

When shopping for PC-based lead tracking software, analysts say, each company should start with an inexpensive, off-the-shelf package to learn what it needs.

"A company doesn't know enough [about] how to customize right off the bat," says Dennis Brown, a partner at IDK Group, Inc., a Culver City, Calif.-based sales productivity company. "They end up rewriting the customized package two or three times and wasting a lot of money," Brown says.

However, Barton Goldenberg, president of Information Systems Marketing, Inc., a Washington, D.C.-based consulting firm, disagrees. He says he knows of companies that tried that strategy and wasted a lot of money because the sales force was not happy and became reluctant to try any other packages.

"The future in these products is [not only] tailored software you can buy and install yourself but a product that can also be expanded in the future," Goldenberg says.

Regardless, customers should check into the financial stability of the vendor before making any purchase, analysts advise.

Industry estimates claim that 100 new companies enter the PC sales force automation business each year, and approximately the same number go under.

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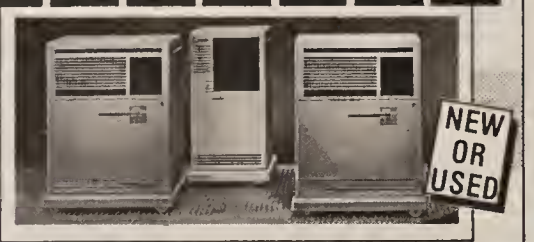

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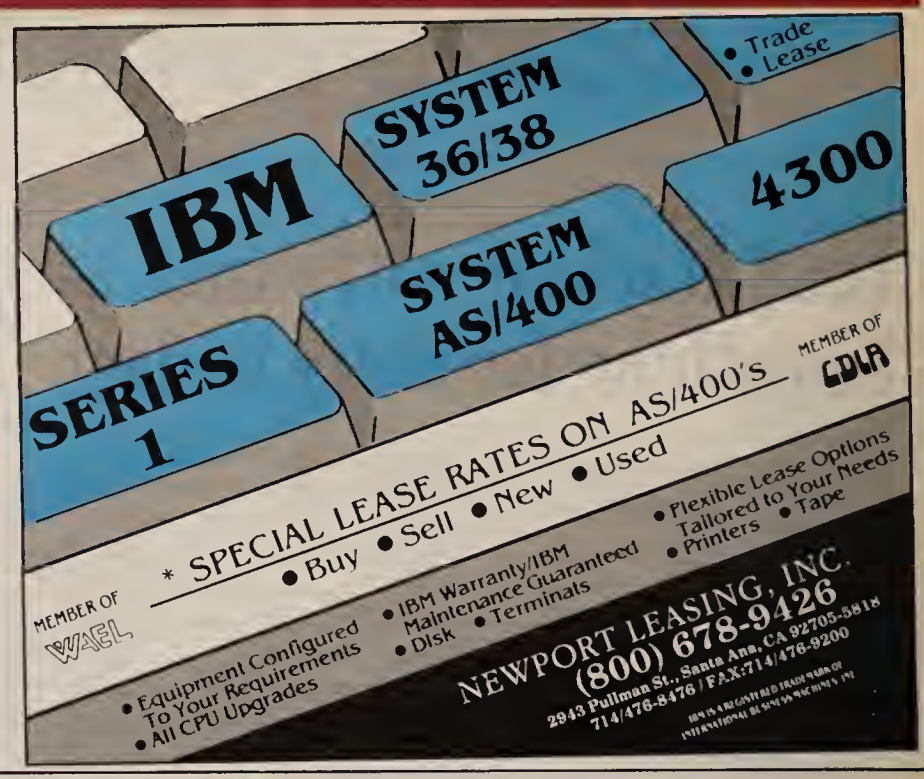

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STOCK TRADING INDEX

Industry Almanac

RECOMMENDATION CHANGES

DOWNGRADED FROM HOLD TO SELL: **Digital Equipment Corp.** (Prudential Securities, Inc.). Despite the damage DEC shares have already seen, prices will fall further. The company probably has several quarters of operating losses ahead. Alpha chip announcements buoyed the stock, but investors now have few near-term positives on which to base buys. Revenue has not been this low since fiscal year 1987.

VAX 9000 and 6000 sales continue to fall, despite the fact that the 6000 was propped up with a new model last October. The VAX 4000s did not show sequential growth either. DEC's low-end strength carries a high price. Workstation volume last quarter was about 8,500 units, up from last year's 5,400. But this unit gain may have come with little or no increase in margins: DEC has become one of the most cutthroat pricers in this sector.

UPGRADED FROM BUY TO STRONG BUY: **Conner Peripherals, Inc.** (Bear, Stearns & Co.). Disk drive demand was very strong this quarter for Conner and its rivals. Conner, in particular, benefited from the uptick in demand for notebook computers that use 2½-in. drives because the company dominates that segment.

Gateway 2000, a large U.S. direct marketer, has indicated that it might introduce its own notebook, which would reward Conner in two ways: Gateway is a big customer, and Gateway's entry into the notebook fray could set off a price war that could spark demand, just as it did for desktops.

NEW COVERAGE

INITIAL RATING OF BUY: **Parametric Technology Corp.** (Prudential). This maker of computer-aided design and manufacturing (CAD/CAM) software racked up 75% sales growth for 1991 and appears to be showing similar gains this year. Parametric is responsive to customers. CAD/CAM vendors such as Computervision and Intergraph Corp. have ported packages from mainframes and minicomputers to specific workstations. However, users want to be able to use workstations of their choice. Parametric plans new releases twice a year and rolls them out for all platforms at the same time rather than stretching the release process over several months.

KIM S. NASH

Computerworld Weekly Stock Ticker

CLOSING PRICES THURSDAY, APRIL 16, 1992

TOP PERCENT GAINERS

Synoptics Communications	18.13
Rasterops	14.93
Parametric Technology	14.88
Knowledgeware Inc.	13.27
Chipcom Corp.	12.64
Texas Instruments*	12.40
Computer Sciences*	10.81
Motorola Inc.*	t0.29

TOP PERCENT LOSERS

VLSI Technology	-18.57
Dataram Corp.	-16.67
Wordstar	-16.67
Gandalf Technologies Inc.	-15.00
Systems Center Inc.*	-13.73
Octel Communications Corp.	-12.82
Cognos Inc.	-12.16
Chips and Technologies	-1t.27

TOP DOLLAR GAINERS

Microsoft Corp.*	11.63
Motorola Inc.*	7.63
Hewlett-Packard Co.*	7.50
Computer Sciences*	6.88
3M Co.	4.88
Xerox Corp.	4.75
Parametric Technology	4.50
Novell Inc.*	4.13

TOP DOLLAR LOSERS

Octel Communications Corp.	-3.75
Dataram Corp.	-3.00
IPL Systems Inc.	-2.50
Group I Software	-2.00
Harris Corp.	-2.00
Sterling Software Inc.	-1.88
Quarterdeck Office Sys.	-1.75
Easel Corp.	-1.75

Exch	52-Week		Range	April 16 Close	Wk Net Change	Wk Pct Change
Communications and Network Services						**Up 0.79%**
OTC	15.00	6.75	3 COM Corp.*	10.88	-0.63	-5.43
NYS	66.00	55.75	American Info Techs Corp.*	60.75	2.00	3.40
NYS	43.00	32.88	AT&T*	43.00	1.25	2.99
OTC	4.25	1.25	Artel Communication Corp.	1.63	0.13	8.33
NYS	50.63	40.25	Bell Atlantic Corp. (L)	42.63	1.38	3.33
NYS	53.00	43.38	Bellsouth Corp.	45.63	1.25	2.82
NYS	9.38	4.75	Bolt, Beranek & Newman	5.88	0.13	2.17
NYS	65.88	30.25	Cabletron Systems	55.25	0.63	1.14
OTC	31.00	11.75	Chipcom Corp.	25.63	2.88	12.64
OTC	43.63	13.88	Cisco Systems Inc.	38.63	t.13	3.00
OTC	35.25	13.75	Compression Labs Inc.	22.00	0.25	1.15
OTC	4.63	1.50	Data Switch Corp.	2.00	0.00	0.00
NYS	23.63	12.38	Digital Comm. Assoc.*	19.75	-0.13	-0.63
OTC	t9.25	8.50	Digital Systems Int'l Inc.	10.75	-1.00	-8.51
OTC	9.75	3.63	DSC Communications	5.13	-0.38	-6.82
OTC	10.88	5.00	Fibronix Int'l Inc.	6.38	-0.13	-1.92
OTC	37.50	13.50	Filenet Corp.	24.75	0.25	1.02
OTC	3.75	1.13	Gandalf Technologies Inc.	2.13	-0.38	-15.00
OTC	2.69	1.19	Gateway Communications	1.63	-0.13	-7.14
NYS	5.50	2.13	General Datacomm Inds.	4.75	0.00	0.00
ASE	5.88	0.50	Go Video	3.13	-0.13	-3.85
NYS	35.00	28.13	GTE Corp.*	31.88	2.13	7.14
NYS	70.63	50.00	ITT Corp.	65.50	1.13	1.75
OTC	36.13	25.25	MCI Commmunications Corp.	33.13	1.88	6.00
OTC	14.50	5.00	Microcom Inc.	10.25	-0.75	-6.82
NYS	18.25	7.00	Network Equipment Tech.*	14.00	0.13	0.90
OTC	25.50	6.75	Network General	t8.50	0.50	2.78
OTC	20.00	10.63	Network Systems Corp.	13.63	0.13	0.93
OTC	17.88	5.50	Newbridge Networks Corp.	t7.00	-0.25	-t.45
NYS	49.25	32.50	Northern Telecom Ltd.*	48.00	3.25	7.26
OTC	65.00	22.63	Novell Inc.*	58.25	4.13	7.62
NYS	82.38	68.00	Nynex Corp.*	74.75	3.25	4.55
OTC	37.50	16.50	Octel Communications Corp.	25.50	-3.75	-12.82
OTC	11.63	5.63	Penril Data Comm. Ntwks.	6.88	0.13	1.85
OTC	53.00	19.75	Picturetel Corp.	37.50	2.38	6.76
OTC	18.75	9.75	Proteon Inc.	12.75	-1.50	-10.53
NYS	19.75	11.63	Scientific Atlanta Inc.	16.25	-0.25	-1.52
NYS	66.00	49.00	Southwestern Bell Corp.	61.50	2.75	4.68
OTC	46.25	14.25	Synoptics Communications	23.63	3.63	18.13
NYS	31.50	21.00	United Telecom	21.88	0.00	0.00
NYS	38.88	32.88	US West Inc. (L)	34.63	1.38	4.14
OTC	41.25	21.25	Wellfleet Communications	35.25	-0.38	-1.05
PC / Workstations						**Up 1.93%**
OTC	18.00	6.25	Advanced Logic Research (L)	6.50	-0.25	-3.70
OTC	70.00	40.25	Apple Computer Inc.*	59.00	3.50	6.31
OTC	32.25	14.50	AST Research Inc.*	17.25	1.00	6.15
NYS	20.00	10.13	Commodore Int'l	13.75	-0.13	-0.90
NYS	61.88	22.13	Compaq Computer Corp.*	26.00	1.13	4.52
OTC	28.13	13.50	Dell Computer Corp. (H)	28.13	2.50	9.76
OTC	7.75	3.00	Everex Systems Inc.	6.75	-0.25	-3.57
NYS	34.00	21.25	Harris Corp.	29.38	-2.00	-6.37
NYS	85.00	44.63	Hewlett-Packard Co.*	81.75	7.50	10.10
OTC	t9.13	7.88	Mips Computer Systems	11.13	0.50	4.71
NYS	29.75	13.25	Silicon Graphics	18.75	0.75	4.17
OTC	38.63	20.75	Sun Microsystems Inc.*	28.50	0.75	2.70
NYS	35.63	23.38	Tandy Corp.*	29.25	1.63	5.88
NYS	11.13	5.13	Zenith Electronics	8.38	-0.25	-2.90
OTC	25.50	10.50	Zeos International Ltd. (L)	11.75	-1.00	-7.84
Large Systems						**Up 0.12%**
ASE	20.63	11.63	Amdahl Corp.*	15.13	0.75	5.22
NYS	t3.38	7.50	Control Data Corp.	11.50	-0.25	-2.13
NYS	t9.25	8.88	Convex Computer	10.63	0.00	0.00
OTC	19.63	3.75	Cray Computer	4.75	-0.13	-2.56
NYS	52.25	31.50	Cray Research Inc.*	4t.00	2.25	5.81
NYS	22.50	8.00	Data General Corp.	9.25	0.00	0.00
NYS	73.50	44.00	Digital Equipment Corp.* (L)	46.25	1.00	2.21
NYS	109.38	81.63	IBM*	88.63	2.63	3.05
NYS	128.25	93.50	Matsushita Electronics	99.50	0.00	0.00
OTC	27.00	10.75	Pyramid Technology	12.63	-0.88	-6.48
OTC	18.50	7.50	Sequent Computer Sys.	12.25	-1.00	-7.55
OTC	18.38	10.13	Sequoia Systems Inc.	14.38	-0.75	-4.96
NYS	54.25	27.25	Stratus Computer Inc.*	44.63	2.63	6.25
NYS	17.63	9.50	Tandem Computers Inc.*	12.88	0.25	1.98
OTC	4.50	1.25	Tandon Corp.	1.25	-0.13	-9.09
NYS	11.75	3.25	Unisys Corp.*	10.13	0.50	5.19
ASE	7.50	2.00	Wang Labs Inc. (b)*	5.13	0.25	5.13
Software & DP Services						**Off 0.27%**
OTC	68.50	39.25	Adobe Systems Inc. (L)	4t.75	1.88	4.70
OTC	13.25	3.50	Al Corp.	8.50	0.13	1.49
OTC	54.50	21.50	Aldus Corp.	22.13	-0.25	-1.12
OTC	19.75	10.13	American Software Inc.	16.13	0.75	4.88
OTC	20.00	7.50	Ask Computer Systems	t3.38	-0.75	-5.31
OTC	62.25	23.25	Autodesk Inc.	33.75	-0.75	-2.17
OTC	37.75	13.25	Bachman Info. Systems (L)	13.50	-0.38	-2.70
OTC	42.50	25.88	BGS Systems Inc.	36.00	1.25	3.60
OTC	79.00	33.00	BMC Software Inc.	63.00	3.00	5.00
OTC	20.00	8.75	Boole & Babbage	19.63	0.13	0.64
OTC	86.75	39.50	Borland Int'l Inc.*	52.63	0.63	1.20
OTC	11.25	4.75	CE Software	6.13	0.25	4.26
ASE	13.75	6.50	Cheyenne Software Inc.	t1.38	-0.63	-5.21
OTC	20.38	7.50	Cognos Inc.	8.13	-1.13	-12.16
NYS	17.00	7.25	Computer Associates*	14.88	0.75	5.31
Semiconductors						**Up 1.04%**
NYS	21.50	8.38	Advanced Micro Devices	16.75	0.13	0.75
NYS	12.50	7.00	Analog Devices Inc.	10.00	0.00	0.00
OTC	18.88	6.75	Atmel Corp.	9.00	0.25	2.86
OTC	t4.13	7.00	Chips and Technologies	7.88	-1.00	-11.27
NYS	24.50	10.13	Cypress Semiconductor Corp	10.13	-0.88	-7.95
NYS	11.63	6.25	Dallas Semiconductor	8.63	-0.13	-1.43
OTC	68.75	38.50	Intel Corp.*	52.25	1.13	2.20
NYS	11.88	6.50	LSI Logic Corp.	7.00	-0.25	-3.45
NYS	22.38	10.88	Micron Technology	14.63	-0.25	-1.68
NYS	82.50	54.00	Motorola Inc.*	81.75	7.63	10.29
NYS	t1.50	3.88	National Semiconductor*	9.88	0.88	9.72
OTC	27.00	13.00	Sierra Semiconductor	18.00	t.50	9.09
NYS	43.25	26.00	Texas Instruments*	36.25	4.00	12.40
OTC	11.63	5.88	VLSI Technology	7.13	-1.63	-18.57
OTC	15.75	3.75	Weitek	4.50	-0.25	-5.26
ASE	6.25	2.00	Western Digital Corp.	3.75	0.13	3.45
OTC	32.50	19.25	Xilinx	26.50	2.38	9.84
OTC	11.50	4.25	Zilog Inc.	8.63	0.63	7.81
Peripherals and Subsystems						**Up 1.29%**
OTC	2.69	1.00	Apertus Technologies	1.69	0.00	0.00
OTC	10.00	2.75	Archive Corp.	9.38	0.25	2.74
OTC	24.00	11.25	Banctec Inc.	22.00	0.50	2.33
OTC	23.50	4.88	Cambex Corp.	15.75	0.00	0.00
ASE	13.88	7.00	Cognitronics Corp.	13.88	0.75	5.71
NYS	28.13	12.50	Conner Peripherals*	20.00	1.38	7.38
ASE	19.66	3.22	Dataram Corp.	15.00	-3.00	-16.67
NYS	16.88	4.88	EMC Corp.	13.25	0.38	2.91
OTC	9.75	4.75	Emulex Corp.	8.00	0.38	4.92
OTC	23.00	14.75	Evans & Sutherland	16.25	1.13	7.44
OTC	40.63	13.38	Exabyte	37.75	-0.38	-0.98
OTC	27.25	14.75	Intelligent Info. Systems	24.75	-0.75	-2.94
OTC	11.25	4.00	Iomega Corp.	7.50	0.25	3.45
OTC	34.75	14.50	IPL Systems Inc.	26.75	-2.50	-8.55
OTC	24.50	11.75	Komag Inc.	14.00	0.75	5.66
OTC	12.25	1.63	Maxtor Corp.*	11.63	0.38	3.33
OTC	15.88	5.50	Micropolis Corp.	11.00	0.00	0.00
NYS	98.75	83.50	3M Co.	92.75	4.88	5.55
OTC	9.25	3.50	Printronix Inc.	5.75	-0.50	-8.00
NYS	26.75	9.75	QMS Inc. (L)	10.00	-0.38	-3.61
OTC	18.00	8.88	Quantum Corp.	15.50	0.63	4.20
OTC	12.25	5.00	Radius Inc.	11.00	0.88	8.64
NYS	12.88	5.88	Recognition Equipment	10.25	-0.38	-3.53
OTC	12.50	5.38	Rexon Inc.	10.50	0.13	1.20
OTC	16.50	7.13	Seagate Technology*	14.25	0.88	6.54
NYS	78.00	34.75	Storage Technology*	60.13	1.38	2.34
NYS	30.88	16.00	Tektronix Inc.	19.13	-0.13	-0.65
NYS	82.25	51.50	Xerox Corp.	77.00	4.75	6.57
Services						**Up 2.16%**
OTC	28.25	16.25	American Mgmt. Systems*	21.00	1.75	9.09
NYS	5.38	2.88	Anacomp Inc.	4.50	-0.13	-2.70
OTC	19.00	12.00	Analysts Int'l	t7.25	1.25	7.81
NYS	49.00	29.50	Auto Data Processing*	46.50	2.63	5.98
NYS	26.78	13.00	Comdisco Inc.* (L)	13.50	0.13	0.93
OTC	t3.50	7.75	Computer Horizons	t2.25	0.75	6.52
NYS	84.88	52.25	Computer Sciences*	70.50	6.88	10.8t
NYS	10.38	7.00	Computer Task Group	9.38	0.00	0.00
OTC	19.25	7.75	Corporate Software	14.25	-1.50	-9.52
OTC	30.75	12.75	Egghead Discount Software	24.50	t.88	8.29
NYS	33.06	22.75	General Motors E (EDS)*	29.63	1.13	3.95
OTC	30.38	8.88	Intelligent Electronics	t3.38	-0.63	-4.46
OTC	14.88	2.25	Merisel	t2.50	0.13	1.0t
OTC	t5.75	5.75	Microage Inc.	12.38	-0.13	-1.00
OTC	41.25	19.50	Paychex	38.25	1.50	4.08
NYS	73.00	43.25	Policy Management Sys.	69.25	1.00	1.47
NYS	41.38	19.38	Reynolds and Reynolds	40.63	2.13	5.52
OTC	32.00	21.25	SEI Corp.	27.50	-0.50	-1.79
OTC	24.38	17.00	Shared Medical Systems	t9.13	-0.13	-0.65
OTC	24.25	13.50	Sungard Data Systems	23.00	0.00	0.00
NYS	6.t3	1.13	Ultimate Corp.	2.00	0.00	0.00

KEY: (H) = New annual high reached in period (L) = New annual low reached in week

* Companies tracked in Computerworld Stock Index

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Second-class postage paid at Framingham, Mass., and additional mailing offices. *Computerworld* (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Copyright 1992 by CW Publishing/Inc. All rights reserved. *Computerworld* can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed. Back issues, if available, may be purchased through Margaret McIndoe. Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970, 508-744-3350. Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $2.00 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So. America — $130 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002.
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ABP ABC

IN BRIEF

X vendor makes IPO

■ X terminal maker **Network Computing Devices, Inc.** in Mountain View, Calif., last week filed for an initial public offering of 2.5 million shares of common stock with the Securities and Exchange Commission. The company hopes to raise between $30 million and $35 million. In addition, the firm has expanded its array of X Window System-based products with the $4.5 million cash acquisition of Spectragraphics Corp.'s GSS Personal Graphics Division, a Beaverton, Ore.-based developer of software that allows personal computers to emulate X terminals.

■ **WordStar International, Inc.** and **Delrina Corp.** have cancelled their proposed merger, citing legal, accounting and management differences. Delrina balked at WordStar's emphasis on marketing rather than products, analysts said.

Short takes

Bill Gates' personal worth soared $652 million, to $7.3 billion late last week, following a climb of almost $12 per share in **Microsoft Corp.** stock. The uptick came after a California court dismissed the crux of an **Apple Computer, Inc.** suit that alleged that Windows copied the Macintosh's "look and feel." . . . **EMC Corp.** last week filed a libel suit against **IBM**, charging the industry leader with making false statements in a press release that covered the two companies' court battle over memory replacements on mainframes owned by IBM Credit Corp. . . . **Sequent Computer Systems, Inc.** has completed a $20 million private placement of convertible debentures. . . . Third-quarter profits at **AST Research, Inc.** in Irvine, Calif., came in flat at $16.7 million, compared with the same period last year.

CIA steps up foreign technology watch

Agency seeks to prevent predatory or subversive targeting of U.S. research and development

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Central Intelligence Agency, casting about for post-Cold War missions, plans to dramatically increase monitoring of foreign economies, including developments in computer, semiconductor and networking technologies.

"In each of these areas, U.S. dominance is a thing of the past," said CIA Director Robert M. Gates in a speech delivered last week in Detroit. A recent governmentwide review of intelligence needs through the year 2005 showed that 40% of new requirements were economic in nature, he said.

The CIA and its sister agencies will need to monitor foreign compliance with trade agreements and will try to uncover "predatory or subversive targeting of U.S. markets, technologies, investments and research and development," Gates said.

Closer track

Riley Repko, director of government affairs at Oracle Corp., said it will be good news if U.S. policymakers and the industry are better informed about foreign trade and technology strategies.

The electronics industry generally supports stronger government efforts to collect and disseminate information useful to U.S. high-technology companies, said Pat Hubbard, spokeswoman for the American Electronics Association. She had no firm position on whether the CIA is right for the job, however.

Gates ruled out any chance of the CIA spying for individual U.S. companies. "I have serious concerns about the ethical, legal and sources-and-methods questions surrounding the issue of industrial espionage," Gates said.

Experts said the problems associated with direct spying for U.S. companies include possible disclosure of CIA methods and sources, retaliation by foreign intelligence agencies and the difficulty of distributing the results fairly to U.S. companies.

"I think he's struck the right balance," said William G. Morin, director of the National Association of Manufacturers' Council on High Technology. Morin said it would be unfair for the CIA to share intelligence — such as a technical breakthrough or bidding strategy — with one U.S. company and not another.

"That's such a can of worms," Morin said. "If the CIA intercepts some technology development from Japan, should they give it to IBM or DEC or Unisys or a smaller wannabe?"

Michael C. Sekora, a former technology tracker at the Defense Intelligence Agency, said he doubts the CIA's economic intelligence effort will really help U.S. competitiveness. He said U.S. intelligence agencies usually produce "sweeping generalities that are basically useless" for individual companies trying to be more competitive.

Truly useful competitor intelligence results from finding the specific nuggets of information that will help a company meet its business objective, not from "dumping a load of neat information," said Sekora, now president of Technology Strategic Planning, Inc. in Stuart, Fla.

Mark Falcoff, an intelligence policy analyst at the American Enterprise Institute, noted that the CIA has always done some economic analysis, but the new forays may go too far. "I know they're trying to find new missions, but they have enough to worry about with terrorism and drug trafficking. They should stick to that," Falcoff said.

I spy

Although he could not disclose specifics, Gates said some foreign intelligence agencies are actively trying to steal technology secrets from U.S. businesses. The French government, for example, reportedly has spied on IBM and Texas Instruments, Inc. for state-owned Groupe Bull [CW, March 4, 1991].

"We have cases of moles being planted in U.S. high-tech companies. We have cases of U.S. businessmen abroad being subjected to bugging, to room searches and the like," Gates said.

U.S. Sen. David L. Boren (D-Okla.), chairman of the Senate Committee on Intelligence, reportedly wants to explore whether commercially useful information picked up by the CIA could be "sanitized" and channeled via the U.S. Department of Commerce to U.S. companies.

Boren's counterpart in the House of Representatives, Rep. Dave McCurdy, (D-Okla.), said he agreed that the CIA should report on worldwide economic trends and technology developments, but he said it should not duplicate the work of other federal agencies and private businesses.

Technosleuth

The Bush administration's requests for "economic intelligence" fall into the following three categories:

- **Analyzing foreign economics and providing data to U.S. policymakers and trade negotiators.**
- **Monitoring trends in technology that could affect national security.**
- **Protecting U.S. businesses from foreign intelligence agency spies.**

CW Chart: Michael Siggins

Exec resigns from Sun for Autodesk CEO post

BY MARYFRAN JOHNSON
CW STAFF

MOUNTAIN VIEW, Calif. — An executive who played an instrumental role in managing Sun Microsystems, Inc.'s rapid growth resigned last week to head up Autodesk, Inc., the leading vendor of personal computer-based computer-aided design software.

Carol Bartz, formerly vice president of worldwide field operations at Sun Microsystems Computer Corp., has been named president and chief executive officer of Autodesk. She was replaced at Sun by Joseph Roebuck, who most recently served as vice president of U.S. field operations.

At Autodesk, Bartz is replacing Alvar Green, who announced his intention to retire as CEO in October 1991. Green will remain as a director of the firm.

"The Wall Street community is disappointed that Carol is leaving, but this gives her the chance to run her own show, and Autodesk needs help turning itself around," said Timothy R. McCollum, an analyst at Dean Witter Reynolds in New York.

"Joe [Roebuck] is a good choice to replace her. He's run U.S. sales for a while and hung in pretty well through some difficult times," McCollum said.

Roebuck said last week that his management style will be the most notable difference in how he runs the worldwide field operations. "I'll probably spend more time outside the company, meeting customers and sales teams. Carol was more of an inside management person," he said.

Roebuck and Bartz joined Sun in 1983 and rose swiftly through the ranks.

Industry analysts said Autodesk, which has lost some credibility with the financial community during months of internal company turmoil, has strong technology behind its flagship product, AutoCAD. But the company's marketing and management abilities have been criticized as the growth of the $274 million vendor has slowed during the past year.

"From what we've heard about Carol Bartz, she'll bring more breadth to Autodesk," said Wayne Palioca, vice president of workstation integration at Ketiv Technologies, Inc. in Portland, Ore., one of the largest AutoCAD dealers in the country. "They're about due for a new version of AutoCAD, but I think they have their ducks in a row."

> "THE WALL STREET community is disappointed that Carol is leaving, but this gives her the chance to run her own show."
>
> TIMOTHY R. MCCOLLUM
> DEAN WITTER REYNOLDS

TRENDS

RESIDUAL VALUES

MARKET PRICE DRAIN

IBM and Amdahl storage values decline as cost advantages of mainframe RAID products kick in

Retail residual value projections

IBM Model 3390-A38

Announced: **9/91**
List price: **$251,350**
Capacity: **22.7G bytes**

1/94: **$100,540**
Cost per 1M byte: **$4.43**

1/95: **$42,730**
Cost per 1M byte: **$1.88**

Amdahl Model 6390-A3F

Announced: **1/92**
List price: **$457,950**
Capacity: **45.4G bytes**

1/94: **$178,601**
Cost per 1M byte: **$3.93**

1/95: **$91,590**
Cost per 1M byte: **$2.02**

IBM Model 3390-B3C

Announced: **9/91**
List price: **$337,900**
Capacity: **34G bytes**

1/94: **$152,055**
Cost per 1M byte: **$4.47**

1/95: **$67,580**
Cost per 1M byte: **$1.99**

Amdahl Model 6390-B3F

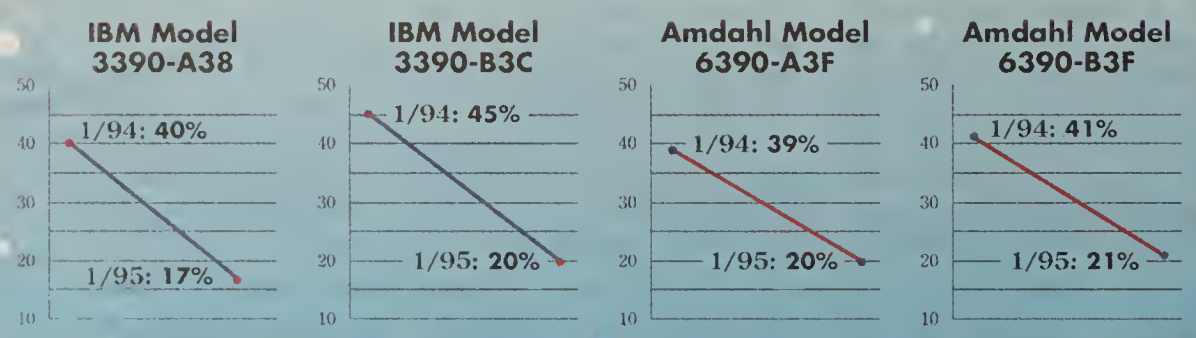
Announced: **1/92**
List price: **$441,200**
Capacity: **45.4G bytes**

1/94: **$180,892**
Cost per 1M byte: **$3.98**

1/95: **$92,652**
Cost per 1M byte: **$2.04**

Projected used retail value

(as a percentage of list price)



Source: Technology Investment Strategies Corp., Framingham, Mass.

CW Chart: Tom Monahan

INSIDE LINES

Seeking converts

► As promised, next week's opening of DECworld should see DEC adding substance to last February's Alpha announcement. Among the notables: Alphatronics, a 64-bit "super pipeline," or superscalar RISC microprocessor board based on the Alpha chip, that DEC is making available to a number of computer vendors. DEC will announce two familiar names that will remarket the board: Cray and Kubota. Under the heading of damage control, DEC will detail some VAX-to-Alpha migration paths, analysts said, to reassure nervous VAX users.

Calling all power users

► Another high-end server will join the IBM RS/6000 line of Unix-based systems this week, breaking into new performance territory at 103 SPECmarks, IBM sources confirmed last week. The RS/6000 Model 970, to be officially announced tomorrow, is a rack-mounted uniprocessor with a 50-MHz CPU. A minimum configuration starts at $97,000. The box is targeted at the market for network file servers, database servers and numerically intensive compute servers. As the new top-of-the-line RS/6000, the machine will feature expanded disk storage to 100G bytes and a "Master Micro Channel" implementation that doubles the line's current 40M to 80M byte/sec.

Back to the holy land?

► It would appear that FDDI pioneer Fibronics is falling short of its 2-year-old goal to build its U.S. business to 50% of worldwide revenue. The firm is reportedly set to reorganize and consolidate its Hyannis, Mass., operations, eliminating the top U.S. management tier and significantly reducing its domestic work force. The company has not built a noticeable U.S. presence, while its Haifa, Israel, sales team is performing well, as evinced by a recently inked contract with Euro-Disney in Paris for FDDI bridges tying together 100 locations.

Are they desperate or what!

► IBM Vice President Jim Cannavino pulled off a brilliant developer seeding program last week at Borland's Second Annual International Developer's Conference in Monterey, Calif. After regaling more than 1,000 attendees with the joys of OS/2 2.0 for more than an hour over lunch, he gave them an offer they couldn't refuse: a free copy of the new operating system to take home and try out.

Promises delivered

► Meanwhile, Borland Vice President Eugene Wang offered a peek at an upcoming spate of developer tools, including ObjectVision and Borland C++ for OS/2. Wang said the arrival of the ObjectVision for OS/2 graphical application builder is "imminent," while the $749 Borland C++ for OS/2 is expected to arrive in June. He also showcased an upcoming Turbo Pascal for Windows Version 1.5, which will sell for $149.95 (upgrades will cost $49.95).

Quattro Pro? Not yet!

► Analysts like those at Alex. Brown are still predicting that Borland's Quattro Pro for Windows could arrive as early as June, but the folks at Borland are a lot murkier. Look for the package to ship sometime around August, sources there say.

Noted sighting

► Compaq has brightened its color notebook development, dumping a passive-matrix design in favor of an active-matrix screen, a source close to the company said. The product is heading to market in June and will cost significantly more than the ones Gateway is scheduled to introduce in May.

Users of Microsoft's recently released Windows 3.1 who want a glimpse of the team behind the product may want to try this: Pull down the Program Manager Help menu, hold down the Control and Shift keys, click on the About . . . menu item; then, while still holding down the keys, double-click on the Windows logo. Results vary, and nothing may happen the first time around, so try it several times. Brad Silverberg will thank you for it. . . . Phone, fax or CompuServe News Editor Alan Alper at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try calling us at (508) 820-8555.

NEXT WEEK

Coping with deadline pressure is a way of life for Rich Tennant. But the computer industry's premier cartoonist keeps his wits about him by always remembering to laugh. The creator of The 5th Wave talks about his roller coaster career as cook, actor, housepainter, sandwich board salesman and even typesetter. Next week in In Depth.

David Binder

Russian native Eric Firdman, director of strategic IS at Pacific Bell, has come a long way from his days teaching relational database theory at Vladivostok State University. Firdman now leads the team that is envisioning and designing systems to support Pac Bell's business in the year 2000. Read about his odyssey in a Manager's Journal profile.

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Mouse support

Increased performance for faster results

Shift into the information you need sooner with the dBASE IV v1.5 new optimization technology— IQ!.™ Now dBASE has three different ways of retrieving data and will automatically choose the fastest one for you.

Superior programmability for complex applications

Now up to 40 open work areas are possible at any one time, offering greater flexibility for more complex applications. Enhanced BLANK support gives you the power to detect empty fields for data validation and statistical operations. Plus, the widely respected dBASE Template Language is now standard in dBASE IV v1.5.

IQ! technology

A great product begins with the basics

Behind the new features of dBASE IV v1.5 lies the flexibility of a worldwide standard. No other database software is available on more platforms than dBASE. Add that to the dBASE Control Center with its road- tested design tools and the dBASE Programming Language, featuring integrated IBM's SAA-compliant SQL, integrated debugger, and built-in applications generator, and you have the most well-rounded database management and application development product in the world.

Technology you can build upon

There are no stop signs ahead for dBASE IV v1.5 thanks to its Open Architecture Control Center, allowing you to add third-party designers to your crew—and access additional tools—at any time.

Borland: the new force behind dBASE

dBASE IV v1.5 marks a return of innovation and pride to the dBASE community. And now that dBASE IV v1.5 is part of the Borland family, you can expect Borland's world-renowned service and support.

Now is the time to join the more than three million people who already drive dBASE.

What's new in dBASE IV v1.5?

- Mouse support
- Editable multi-file view
- Calculated field linking
- QBE summary operators & pick lists
- Automatic install
- New optimization technology—IQ!
- Save query indexes
- "INDEX" functions
- 40 work areas
- Template language included
- Enhanced BLANK support
- Browse/edit organize menu toggle
- Conditional compilation
- Low-level file I/O
- Open Architecture Control Center
- Enhanced RUN function

Get dBASE IV v1.5 now!

If you're a current dBASE user, you can upgrade to dBASE IV v1.5 for $99.95. Call and order now. If you're not completely satisfied, Borland will refund your money within 60 days of purchase. No questions asked.

See your dealer today or call now:
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Special upgrade offer

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